

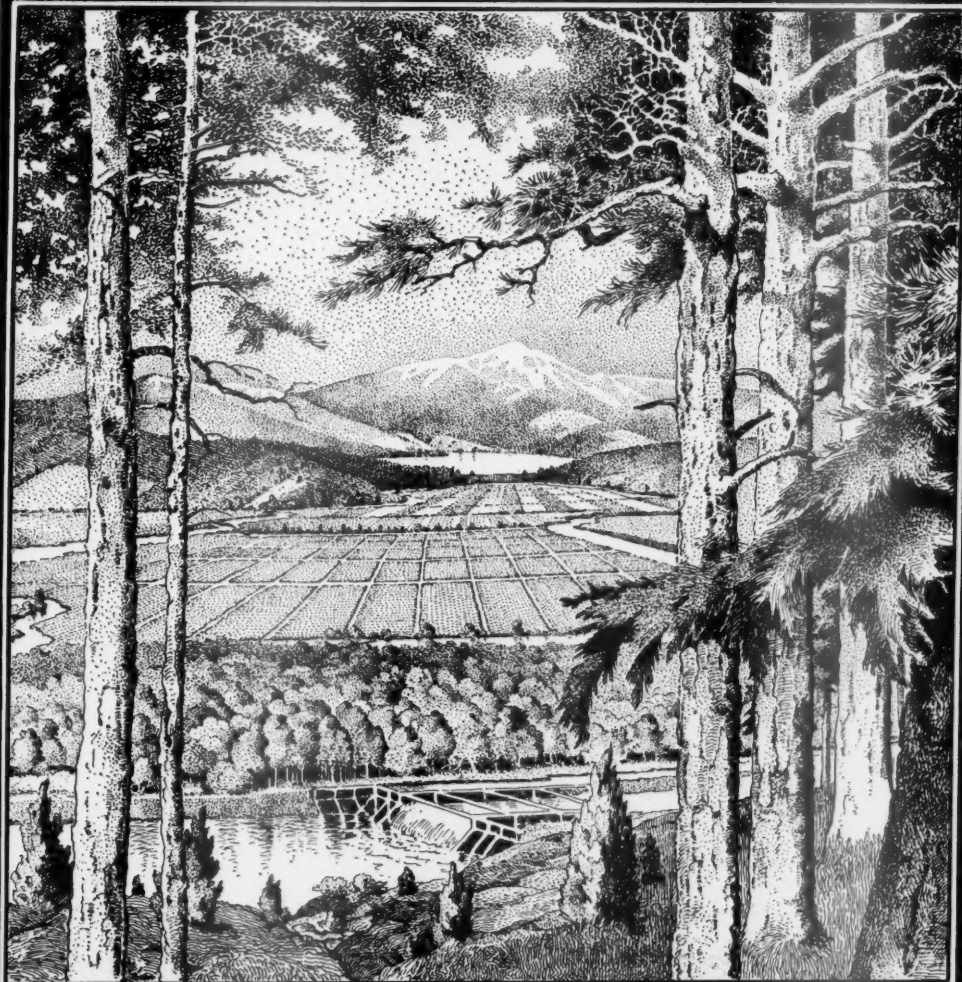
THE AMERICAN INDIAN AND IRRIGATION

Vol. IX—No. 5

MAY, 1903

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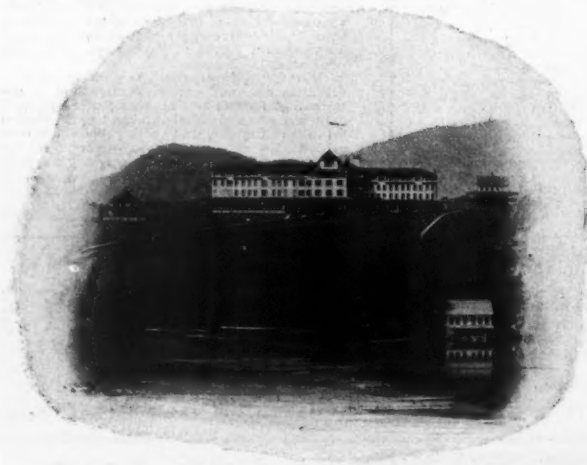
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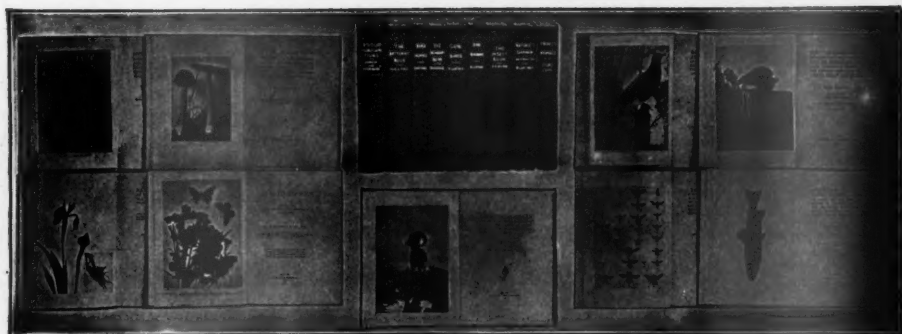
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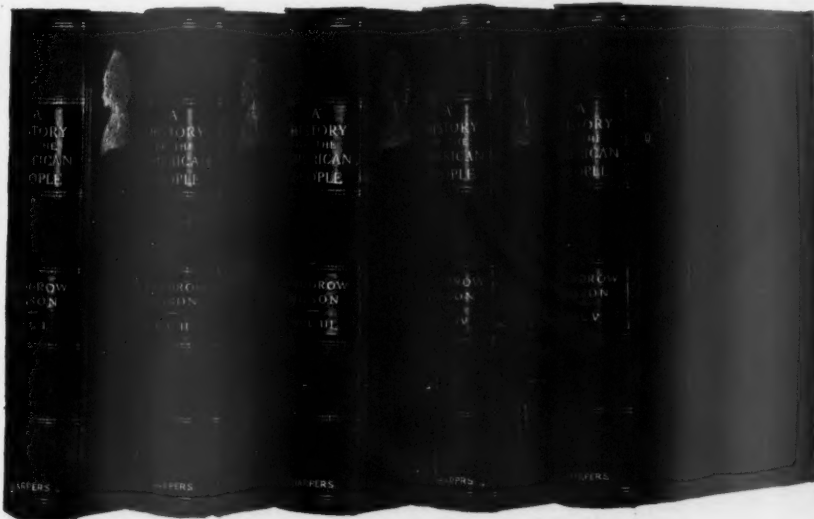
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**The objects of the Association, as set forth in its Constitution, are as follows:**

1. The adoption by the Federal Government of a permanent policy for the reclamation and settlement of the public domain, under which all the remaining public lands shall be held and administered as a trust for the benefit of the whole people of the United States, and no grants of the title to any of the public lands shall ever hereafter be made to any but actual settlers and homebuilders on the land.
2. The preservation and development of our national resources by the construction of storage reservoirs by the Federal Government for flood protection, and to save for use in aid of navigation and irrigation the flood waters which now run to waste and cause overflow and destruction.
3. The construction by the Federal Government of storage reservoirs and irrigation works wherever necessary to furnish water for the reclamation and settlement of the arid public lands.
4. The preservation of the forests and reforestation of denuded forest areas as sources of water supply, the conservation of existing supplies by approved methods of irrigation and distribution, and the increase of the water resources of the arid region by the investigation and development of underground supplies.
5. The adoption of a harmonious system of irrigation laws in all the arid and semi-arid states and territories under which the right to the use of water for irrigation shall vest in the user and become appurtenant to the land irrigated, and beneficial use be the basis and the measure and limit of the right.
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# Forestry and Irrigation

H. M. SUTER, Editor and Publisher

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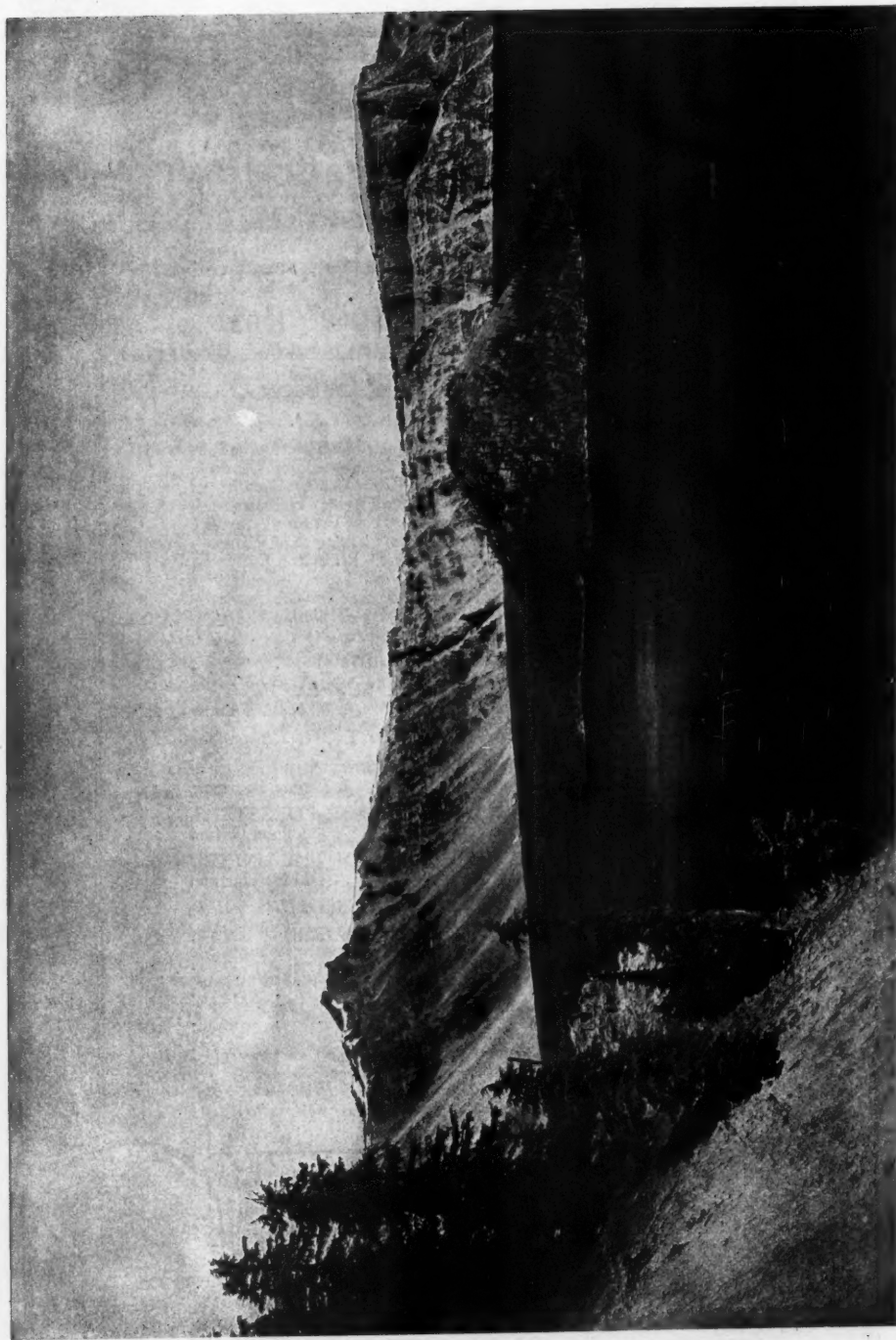
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WESTERN BORDER OF CRATER LAKE, OREGON, SHOWING WIZARD ISLAND, THE VOLCANIC CONE RISING OUT OF THE WATER. (SEE PAGE 236.)

# Forestry and Irrigation.

VOL. IX.

MAY, 1903.

No. 5.

## NEWS AND NOTES.

### **Important Action by Secretary of Interior.**

The action of the Secretary of the Interior, described more fully on another page, in regard to the Salt River Valley Water-Users Association, is one of the most important steps taken in the interpretation and practical application of the reclamation law. It furnishes a precedent for other communities and allows organizations to be formed with a greater definiteness of purpose than has hitherto been possible. The most essential points are the recognition of the necessity of the formation of such organizations and of the fact that the Secretary will deal with the associations rather than attempt to adjust matters individually with hundreds or thousands of small land-owners.

The second important point settled is that the Secretary will require good security from the individuals benefited through the association in such a form as to insure prompt payment to the government without conflict or delay. Nothing could be more destructive to the working out of the purpose of the law than to compel the Secretary of the Interior to collect small amounts from innumerable individuals.

Equality of rights are also assured by this action of the Secretary, as he points out clearly that he expects that the ordinary cost of distribution and maintenance will be assessed against all of the lands, and that a favored few will not be exempt from their share of the expenses.

### **Society of American Foresters.**

On Thursday evening, April 30, the Society of American Foresters held its last open meeting for the season of 1902-1903 with an

illustrated address by Prof. Filibert Roth on the "Present Possibilities of Forest Work in Michigan." The series of open meetings during the past winter was the third annual arranged by the Society and in many ways the most valuable. The subjects discussed were unusually timely and the list of speakers a notable one. President Roosevelt honored the Society of American Foresters by addressing it, as noted in the April number of **FORESTRY AND IRRIGATION**. Other speakers of special note were Mr. Gifford Pinchot, who described forest conditions in the Philippine Islands as he found them on his recent trip to the archipelago; also Mr. F. H. Newell, who discussed the "National Irrigation Act and its Relation to Forestry."

The Society of American Foresters, since its organization at Washington, D. C., November 30, 1900, has become one of the leading factors in advancing forestry in the United States.

The objects of the Society, as set forth in its constitution, are "to further the cause of forestry in America by fostering a spirit of comradeship among American foresters, by creating opportunities for a free interchange of views upon technical and allied forest subjects, and by the dissemination of a knowledge of the purpose and achievements of practical forestry."

The society has unusual opportunities for carrying out its objects from the fact that its headquarters are in Washington, where the larger portion of the professional foresters of the country are located, owing to their connection with the government service.

During the winter season the Society holds weekly meetings, a majority of which are open and to which guests are invited. At each of these meetings

there is a paper or address by some member or guest of the society on some timely topic in connection with forest work. In addition, there is open discussion of the question under consideration. Members and guests present are permitted and encouraged to question the speaker in order to bring out all possible information on the topic before the meeting. The multitude of forest problems confronting American foresters, and the only recent adoption of forestry to any extent, makes this association of ideas and experiences of great mutual benefit. These meetings of the Society of American Foresters afford young foresters unusual opportunities to get in touch with the leading thought and achievements in their profession.

Membership in the Society of American Foresters is divided into three classes: active, associate, and honorary. Active members are chosen only from the ranks of professional foresters; associate members are selected from those gentlemen, not professional foresters, who have rendered notable service to the cause of forestry; honorary members are chosen from professional foresters whose fields of work lie outside of the United States and its possessions.

The membership of the Society of American Foresters includes the following persons:

*Active members.*—Gifford Pinchot, Forester, U. S. Department of Agriculture; Prof. Henry S. Graves, Director, Yale Forest School; H. B. Ayres, U. S. Geological Survey; Dr. C. A. Schenck, Director, Biltmore Forest School; Dr. B. E. Fernow, Director, New York State College of Forestry; Dr. J. T. Rothrock, Forest Commissioner of Pennsylvania; Dr. John Gifford, New York State College of Forestry; Prof. James W. Toumey, Yale Forest School; E. M. Griffith, Bureau of Forestry, Philippine Islands; and Filibert Roth, Overton W. Price, Wm. L. Hall, Ralph S. Hosmer, Thos. H. Sherrard, F. E. Olmstead, Geo. B. Sudworth, Edward T. Allen, John Foley, Henry Grinnell, G. Fred. Schwarz, H. J. Tompkins, all in the Bureau of Forestry.

*Associate Members.*—Hon. James Wilson, Secretary of Agriculture; President Roosevelt; Col. William F. Fox, Superintendent of State Forests of New York; Gen. C. C. Andrews, Chief Fire Warden of Minnesota; F. H. Newell, Chief Engineer, Reclamation Service; Henry Gannett, Geographer, U. S. Geological Survey; Arnold Hague, U. S. Geological Survey; Hon. Chas. D. Walcott, Director of U. S. Geological Survey; Frederick V. Coville, Botanist, U. S. Department of Agriculture; Prof. J. A. Holmes, State Geologist of North Carolina; Otto Luebker, Bureau of Forestry; Geo. P. Whittlesey; Hon. Frank S. Black, ex-Governor of New York; Ex-President Grover Cleveland; Dr. W. Seward Webb; Hon. Wm. C. Whitney; Dr. B. L. Wiggins, Vice-Chancellor of University of the South; J. W. Pinchot; Geo. W. Vanderbilt; Dr. N. H. Egleston; Hon. Willock Noble; Prof. Wm. H. Brewer, Yale University; Hon. D. R. Francis; Prof. Wm. R. Dudley, Leland Stanford University; Capt. Geo. P. Ahern, Chief of Forestry Bureau, Manila, P. I.; Dr. C. Hart Merriam, Chief of Biological Survey, U. S. Department of Agriculture; Prof. V. M. Spalding, University of Michigan; Dr. Charles E. Bessey, University of Nebraska; Hon. Robert W. Furnas, ex-Governor of Nebraska; Prof. Chas. S. Sargent; Prof. J. G. Jack; Judge John B. Waldo; Prof. C. E. Faxon; Hon. E. A. Hitchcock, Secretary of the Interior; Dr. Wolcott Gibbs; Dr. Morris K. Jesup.

Ex-President Benjamin Harrison, Hon. J. Sterling Morton, and Dr. Charles Mohr were also associate members of the Society of American Foresters.

#### Colorado Agricultural College.

Professor L. G. Carpenter, of the Department of Civil and Irrigation Engineering of Colorado Agricultural College and Director of the State Experiment Station at Ft. Collins, has been granted a temporary



leave of absence in order to act as State Engineer of Colorado, a position which includes lines of work much the same as have been carried on in connection with the work of the experiment station. In the meantime Professor Carpenter will retain his connection with the experiment station and have supervisory control of the Department of Civil and Irrigation Engineering at the college.

The Colorado Agricultural College will soon erect a building for the Department of Civil and Irrigation Engineering. This building will include also the offices of the experiment station during 1903-'04. An appropriation for this purpose of \$40,000 has been made by the Colorado State Legislature.

#### **Forest Work in Kansas.**

Western Kansas north of the Arkansas River and west of a line drawn from Osborne through Russell to Larned, will receive the attention of the Bureau of Forestry this summer. A study of the tree growth of that region will begin this month under the direction of R. S. Kellogg, of Russell, Kans., an agent for the Bureau, and will be continued until fall. In this part of the state the timber penetrates the prairies by way of the river bottoms, clinging closely to these moist lands and advancing only occasionally to the uplands.

The Bureau will study the tendency of the trees and shrubs along the water-courses to increase and spread, especially when protected from fire and stock, and will determine what species are best adapted to planting on those uplands that contain no natural growth.

In many places along the streams where fire and stock have been excluded for ten or fifteen years are found thrifty young Cottonwoods, White Elms, Box-elders, and other species which are slowly invading the great plains.

The low rainfall of western Kansas is not alone responsible for the scarcity of timber. The Pine Ridge country of Nebraska grows forests with only 16 inches of rain a year, while the treeless regions of western Kansas

have a precipitation of 16 to 20 inches. Failures in tree planting, aside from natural causes, such as high winds and intense sunlight, are due chiefly to a lack of care in planting and cultivating and a lack of knowledge of what kinds of trees to plant.

Such failures have not been without some value—they have given a fairly good knowledge of what to and what not to plant, and of the methods that are successful and those that are not. It is partly to increase this knowledge that the Bureau has undertaken its study of the tree growth of the state. Timber, fuel, posts, and firewood may be grown in the prairie regions; that fact is established. But the plantations, to be successful, must be composed of the right species, planted in the right way on the right kind of land, and cared for in the right manner.

#### **Death of an Oregon Forester.**

With the recent premature death of Mr. A. J. Johnson, Oregon loses a man who had done much to increase interest in and to promote the cause of forestry in the state. He died at the city of Portland, Oregon, April 10, of pneumonia, at the age of forty-nine.

Mr. Johnson was a native of Sweden, and came to the United States in 1872, settling first in California and later at Astoria, Oregon, where for the last twenty years he has conducted a prosperous forest nursery business, dealing particularly with the Pacific Slope forest trees, shrubs, and other plants.

His wide and practical knowledge of the forest trees of Oregon and of adjacent states early brought him into prominence in state forest exhibition work. His most important work of this kind was the collection and installation of Oregon's forest exhibit at the World's Columbian Exposition, Chicago; Pan-American Exposition, Buffalo, and at the South Carolina Interstate and West Indian Exposition, held at Charleston. The excellence of these displays of Oregon's immense timber resources was due to Mr. Johnson's thorough knowledge

of the forests of the state and to his untiring energy in bringing together desirable material. During the present year he was planning to collect specimens for the Lewis and Clarke Centennial Exposition, to be held at Portland, Oregon, in 1905. It is probable also that had he lived he would have been largely concerned in the preparation of the Oregon State forest exhibit to be installed at the World's Fair, St. Louis, in 1904.

Mr. Johnson's exhaustive contributions of field-notes and other data from which the United States Geological Survey recently compiled a map and description of Oregon forests is a most important work, which he completed as an expert in the employ of the above department. Nearly three years of arduous field travel and study were consumed in this investigation, the results of which are of the greatest prac-

tical value both to foresters and to lumbermen.

Mr. Johnson was widely and very favorably known in Oregon, and he was always keenly alive to furthering the forest and agricultural interests of his state. He has made himself most helpful to many travelers and explorers who under his guidance have studied the forest and other plants of Oregon.

He was a self-made man, whose frank, genial manner won for him many friends to grieve at his passing.

**Business Men Favor the Home-seeker.** The National Business League, with headquarters at Chicago, have printed for distribution copies of resolutions, unanimously adopted by them, recommending an early repeal of the desert land law, the commutation clause of the homestead



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SCENE IN AN OLD FIELD GROWN UP IN PINE, NEAR PINE BLUFF, ARKANSAS. THIS FIELD WAS CULTIVATED IN 1877, AND THE LARGEST TREES ARE NOW ABOUT 16 INCHES IN DIAMETER; RESULT OF KEEPING OUT FIRE.

law, and the timber and stone act. These circulars are headed "Homes for the homeless, lands for the landless." The resolutions follow:

"Whereas, For the reclamation, through irrigation, of the arid regions of the West by the United States Government, for the purpose of providing small tillable farms for settlers and home-builders only, and for the consequent enlargement of the agricultural, industrial, and commercial interests of the country, the national irrigation law was enacted June 17, 1902; and

"Whereas, Through the provisions of certain preëxisting national laws, the spirit and purpose of the aforesaid national irrigation law cannot be properly fulfilled, as indicated in President Roosevelt's second message to the Congress of the United States, December 2, 1902, as follows:

"So far as they are available for agriculture, and to whatever extent they may be reclaimed under the national irrigation law, the remaining public lands should be held rigidly for the home-builder, the settler who lives on his land, and for no one else. In their actual use the desert land law, the timber and stone law, and the commutation clause of the homestead law have been so perverted from the intention with which they were enacted as to permit the acquisition of large areas of the public domain for other than actual settlers and the consequent prevention of settlement:

"Therefore be it

"Resolved, That the National Business League, through its standing committees, hereby respectfully requests the early repeal of the desert land law, the commutation clause of the homestead law, and the timber and stone law, for the purpose of removing all legislation in conflict with, or perversion of, the best interests of the home-seeker and for forest preservation in connection with the aforesaid public lands; and be it further

"Resolved, That copies of this resolution be sent to each member of the Senate and the House of Representatives at Washington, to all manufacturers, commercial organizations, and

prominent business firms throughout the country."

**South Africa and Forestry.** The different provinces of South Africa are making rapid advances

in forest work on account of the need of conservation of resources and, at this time, as a direct result of the active interest of Lord Milner in the subject. He is one of the foremost foresters among Englishmen, and, curiously, Cecil Rhodes was the reverse. Natal has appointed a permanent conservator of forests, and Mr. E. Hutchins, in charge of the South African work, has lately returned from a tour in the Transvaal and Rhodesia, during which he noted material progress. He was formerly in the Indian Forest Service, but has been connected with the same class of work in South Africa since 1891. He is at present trying to get a man from India to take charge of the Transvaal Forest Department, in order to put that province on a secure basis in the work. Rhodesia is taking up forestry. The Island of Mauritius has borrowed \$500,000 for the forest work there. The Cape government railways have appropriated \$50,000 as the first installment of \$250,000 for plantations to grow sleepers, which are now being imported from Australia. The executors of the Rhodes estate have asked Mr. Hutchins for a working plan for the historical Groote Schur forests, and will spend \$50,000 to put them in order.

**New Irrigation Ventures.**

Projects involving extensive irrigation improvements in three western states have

lately been inaugurated. Most of these are in California and Wyoming, and several are of considerable importance. One transaction involving \$500,000 and 30,000 acres of ground is the result of a merging of the interests of the Artesian Water Company, the Santa Monica Water Company, the Water Company of Sawtelle, and a number of individuals, all in the neighborhood of Los Angeles, California. The purpose is to furnish water for irrigation and domestic pur-

poses to all of the Pacific coast area from Los Angeles to the sea, including the supplying of city water to Santa Monica and Playa del Rey.

Another California venture provides for what is termed the most extensive irrigation canal project in the State of California, contracts having been let for the completion of a canal which will extend from the northern boundary of Glenn county to the southern border of Colusa, watering one of the richest sections of the state, through a distance of 85 miles. Press reports say that Elwood Mead has pronounced it the best irrigation project in the state. Twelve years ago \$700,000 were invested and 60 miles of canal were completed, but the financial distress of 1894 involved the company, and work was abandoned. Now it is predicted that water will be turned into the canal from the Sacramento River June 4, and will be carried on a 60-foot bottom at the rate of 3,000 cubic feet per second. About 4,500 acres on the big Glenn ranch have been bought up by the company, which proposes to break up such large tracts into small holdings. Business men of San Francisco, Colusa, Willows, Fresno, and Los Angeles, forming the Central Canal and Irrigation Company, are back of the enterprise.

The Butte County Canal Company, in the same state, will divert the waters of the Feather River to cover 180,000 acres in Butte county in the neighborhood of Oroville, Biggs, Gridley, and Liveoak. Articles of incorporation for the company have been filed, and plans look toward a 15-mile main canal, with 6-foot bottom and a combined length of nearly 200 miles in main and lateral ditches. It is promised that the rate per acre for water will be the lowest in the state.

No less than six irrigation projects are getting under way in Wyoming, some of them of considerable importance. The Boulder Creek Canal Company, in Fremont county, intends to reclaim by irrigation 7,000 acres of land with water from Boulder Creek, about 20 miles north of New Fork. The Encampment-Platte Valley Ditch Company has been organized at Saratoga, Wyo., to construct a 9-mile canal from the

Encampment River to cover 1,100 acres of land on the west side of the Platte. Omaha (Nebr.) capital is being interested in a plan for a large canal to take water from the Big Horn River, 50 miles south of Basin City, Wyo. It is proposed to cover all the land known as Gooseberry Flat, comprising many thousands of acres of fertile soil. The Big Horn Canal Company has built its main canal from the Big Horn River to Fifteen-mile Creek, a distance of 15 miles. Here a tunnel will be necessary before further progress can be made. All of the land under the present ditch has been filed upon by a colony from Indiana. The Wiley Ditch Company, which takes its water from the Grey Bull River, has just had a suit, on account of alleged shortage of supply, decided in its favor, and the farmers along its ditches are promised an abundance of water for all purposes during the coming season.

The Big Horn Basin Development Company will reclaim 250,000 acres of land in the neighborhood of Guernsey under the provisions of the Carey act, and will construct a canal 80 miles long, with a storage reservoir to hold 20,000,000,000 cubic feet of water.

Contracts have been let for damming the Snake River in Idaho at a point 65 miles above Shoshone Falls and building 65 miles of canal on the south and 24 miles on the north side of the river, not including laterals, which will irrigate 340,000 acres under the new government irrigation law. The dam will cost \$400,000 and the main canals \$2,500,000. The latter will be 80 feet wide at the bottom, 160 feet at the top, and will carry 10 feet of water, raised 40 feet from the river.

**Lumber Manufacturers Endorse Forestry.** Last month FORESTRY AND IRRIGATION recorded the meeting of the National Wholesale Lumber Dealers' Association at the national capital, and more recently the annual session of the National Lumber Manufacturers' Association was held in Washington on April 20 and 21. A warm interest in forest



work was displayed and an address by Gifford Pinchot, Forester of the U. S. Department of Agriculture, was enthusiastically received and followed by an interesting discussion. The attitude displayed was one fully in favor of forestry, and a special committee on forestry drew up the following report, which was unanimously adopted by the Association:

"We recognize the wisdom of our government in establishing the Bureau of Forestry, and commend to all lumbermen a careful consideration of the efforts now being made in the interest of preserving and caring for our future timber supply. We pledge our earnest coöperation in every practical plan for the better handling of our forest properties, and urge our membership to labor with their respective state governments for enactment of such laws as will tend to the fullest encouragement of all practical reforestation effort.

"We most heartily endorse the great work sought to be done by our national government in the Appalachian districts, and believe a careful study of the plans under way there will greatly enthuse all who seek knowledge of means for bequeathing to posterity some of the rich blessings so freely bestowed upon our own generation.

"We hereby endorse our hearty appreciation of the great interest the President of the United States has manifested in all questions relating to our industry, and extend to the Bureau of Forestry our thanks for its efforts in our behalf, and especially to its efficient head, Mr. Gifford Pinchot, for his address and the many courtesies he has so graciously bestowed."

IRA CARLEY, *Chairman*.  
J. A. FREEMAN.  
C. C. YAWKEY.

The delegates to the convention visited the Bureau of Forestry, at the invitation of Mr. Pinchot.

**Tree Planting in Alabama.** A planting plan has recently been prepared by the Bureau of Forestry for 1,800 acres of land in Cullman county, Alabama, owned by Emil Ahl-

richs, and valued at from \$1.25 to \$3 per acre. The planting will be done in several different localities in Cullman county. Work will begin as soon as growth ceases next fall, and will continue through the winter, except in freezing weather. The first season's work will include the planting of forest-collected Loblolly Pine seedlings on a tract of 160 acres of open woods. Two hundred and eighty acres will be planted with Chestnut and White and Post Oak. A seed bed will be prepared for the raising of Loblolly Pine for a tract of 640 acres, as it is not considered advisable to use much stock collected from the forest.

The point upon which all this planting is based is that while immense quantities of Loblolly Pine are being cut, there is little or no reproduction, due chiefly to annual fires set to improve the pasture. Mr. Ahlrichs will have a fire-patrol system, and will also treat a tract of 640 acres to improve the natural reproduction by the prevention of fires.

Labor may be obtained at \$15 per month; hence the work can be done at very small cost. It is calculated that the planting will cost only from \$2 to \$3 per acre.

Loblolly Pine is to be planted for the production of construction lumber, Chestnut for posts and telegraph poles, and Oak for railroad ties.

**Forestry in New Mexico.** William L. Hall, Chief of the Division of Forest Extension of the Bureau of Forestry, has just returned from a trip to New Mexico, made at the request of J. J. and H. J. Hagerman, principal members of the South Spring Ranch and Cattle Company, which owns a big ranch near Roswell, in the Pecos River Valley, one of the richest and best irrigated regions in the territory. The company wants to raise trees on a part of its irrigated lands, both for fence posts and for shade and ornamental purposes. Mr. Hall made a planting plan for 450 acres. The trees to be planted for fence posts will be Hardy Catalpa; those to be planted for shade and ornament will be hardwoods, such as Black

Walnut, Pecan, Green Ash, Basswood, Horse Chestnut, White Elm, and Sycamore.

There is no timber in this part of New Mexico except the Cottonwoods that have been planted there. Fence posts of, Sabine Cedar from the canyons of western Texas are shipped in, and cost 15 to 20 cents apiece.

While in New Mexico Mr. Hall made a preliminary examination of 200,000 acres of cut-over timber land owned by William H. Bartlett, of Chicago. The land lies on the east slope of the Rocky Mountains, in New Mexico, about 50 miles southwest of Trinidad, and touches the Colorado line. The land once bore a good growth of Yellow Pine, but the timber has been or soon will be nearly all cut. Mr. Bartlett wants to grow timber on it again, not only for the production of lumber, but that it may serve as a private forest and game preserve.

**Forest Fires.** Already the reports of forest fires are beginning to appear in the daily press of the country, and it seems that the deep snows of winter are hardly melted before fires gain headway in the woods and begin their careers of damage and disaster. Michigan and Pennsylvania have suffered severe loss, and a town in Wisconsin has been destroyed.

**Pennsylvania.**—The worst forest fires in the history of western Pennsylvania were reported as burning fiercely April 30, as we go to press. They are in the vicinity of Bradford, and more than \$1,000,000 worth of property is reported as destroyed. At Watsonville the town was hemmed in on all sides, and the last message from there before the telephone wires came down was that there was no avenue of escape, and that the people and place were doomed. The people of Simpson were rescued by a special train, but lost everything. The oil wells in the neighborhood added to the fierceness of the flames, and it is feared that there was some loss of life. The town of Mount Jewett was saved by heroic efforts, though some buildings were lost, and a number of lumber camps and chemical factories are in

ashes. It is not known how the fire started, but the woods have been burning for a week, being kept under control by fire-fighters until a southeast gale fanned the embers into a torrent of flame that carried everything before it.

**Michigan.**—News received at Houghton, April 28, reported that serious danger was threatened by forest fires on the Michigan peninsula, in the neighborhood of Ontonagon and Mass City. The woods are dry, as there has been but little rain, and at the time the magazine goes to press a more serious fire than that which destroyed Ontonagon in 1896 is threatened. The flames started from bush fires.

**Wisconsin.**—Dispatches from Ashland, dated April 28, report the destruction of the little town of Kimball, rendering most of the inhabitants homeless and destitute. Bayfield was seriously threatened, and forest fires, fanned by a gale, are raging in the vicinity of Ashland.

#### Prizes for Essays on Iowa Trees.

By the generosity of friends, the Iowa Park and Forestry Association makes the following announcement of prizes offered to residents of Iowa who may be interested in the work which it is the purpose of the organization to promote:

1. The Robert Douglas prize of \$25, to be paid to the person presenting the best account of the native forest trees of the state, their present distribution and condition.
2. A not-yet-named prize of \$25, to be paid for the best essay on "Trees for Iowa Farms."
3. A similar prize of \$25, to be paid for the best paper on the subject, "The Ornamentation of School Grounds, both in City and Country."
4. A prize of two years' membership in the Iowa Park and Forestry Association to each high school in Iowa, to be awarded to the member of the senior class presenting at commencement the best essay on the theme, "What Can We Do to Make More Beautiful Our Own Town?"

These prizes will all be awarded at the next session of the Association, in December. Instead of single prizes of \$25 each in the first three cases, first and second prizes may be given of \$15 and \$10 respectively. The prizes may be paid in cash or in trees ready for planting.

Papers must be submitted to the secretary of the Association prior to November 30, 1903.

For further particulars address Thos. H. Macbride, President Iowa Park and Forestry Association, Iowa City, Iowa; L. H. Pammel, Secretary, Ames, Iowa.

**Reclamation Service in North Dakota.** The engineers of the United States Geological Survey are rapidly taking the field in order to continue field work in the various irrigation projects authorized by the irrigation law of June 17, 1902.

North Dakota is one of the states included within the provisions of the law, and as it has at present a considerable fund at its disposal for the construction of works, plans have been made to take up active field work in the immediate future. A number of engineers began work in the state on the first of April, studying the general topography and investigating any irrigation projects that may come to their attention. If the preliminary examination warrants taking action, field parties will be organized and active survey work prosecuted in order to obtain data for estimates of cost. If these estimates show that any particular project is feasible—that is, that the water supply is adequate—that there is a sufficient area of land available for irrigation, and that the cost of bringing water to it is reasonable, recommendations for construction will be submitted to the Secretary of the Interior for his approval.

The present investigations will be largely confined to the western part of the state and will consist of examinations for the diversion of the main Missouri River, although they will also include examinations of its tributaries in the northern and southern parts of the state.

#### **Forestry at Michigan Agricultural College.**

The work of the Department of Forestry at Michigan Agricultural College, which began with the current college year, has progressed favorably. A four-year course has been adopted by the faculty, and two seniors and three juniors are taking the special work in forestry this year, while 31 agricultural students took the elementary work during the winter term.

The equipment of the Department of Forestry is already of such a nature that students have decidedly good advantages for making a general study of the science of forestry. Special office and class-rooms have been provided. For demonstration purposes the Michigan Agricultural College is fortunate in having 3,000 acres of virgin forest in Oscoda county and nearly 200 acres of woodlots on the college farm. Three acres near the campus have been assigned for use as a forest nursery. The college campus contains over 600 native and introduced species of trees and shrubs, exclusive of an arboretum containing 1,200 trees, mainly of native species.

It is planned to convert, as fast as practicable, one tract of 55.5 acres into an arboretum.

#### **Notes on Reclamation Service.**

Mr. Arthur P. Davis, principal engineer of the Government Reclamation Service, is making a trip through the Pecos Valley, N. Mex., in order to look up possible irrigation projects for the consideration of the national government. He will also visit Arizona.

Mr. Morris Bien, of the Geological Survey, is now on a trip through the West, in order to consider the matter of land titles in connection with the irrigation projects recently sanctioned by the Secretary of the Interior. Mr. Bien will visit Salt Lake City, Reno, Nev., San Francisco, Portland, and several points in Montana.

Mr. Charles H. Fitch, one of the leading engineers of the Reclamation Service, has returned from Arizona, where he spent six weeks in inspecting the

work of government field parties along the Colorado River.

**Resolutions on Death of William N. Byers.** The Colorado Forestry Association, at a recent meeting in Denver, passed the following resolutions on the death of

Mr. William N. Byers, president of the organization :

We, the officers and Executive Committee of the Colorado State Forestry Association, hereby desire to express our feeling of bereavement in the death of William N. Byers, President of this Association.

In view of the fact that this Association was organized with William N. Byers in the chair; that he has been constantly associated with it from its inception, in 1884, till the present period; that he has ever been an effective factor in its activity, and its President much of the time; that he was greatly endeared to it, ever endeavoring to make it beneficial to the people of the State; and also in view of a further fact :

That as a private citizen his love of silviculture led him to collect and plant in the grounds of his home no less than thirty-five different kinds and varieties of deciduous trees, foreign to the Rocky Mountains, thus doing more than any other one person in Colorado to demonstrate the adaptability of our climate to practical forestry; therefore be it

*Resolved*, That the cause of forestry and our mountain forests have lost an intelligent and loving friend; that this Association has lost an earnest advocate and wise leader—one who laid broad foundations and built well; one who sowed seeds of wisdom for future harvests—and though we unite our sorrow with the public grief and a stricken family, yet we rejoice in the nobility of one who has builded along every avenue of progress in the history of our city and state; the nobility of one whose footprints are seen in every walk for the betterment of our every-day life; and be it

*Further resolved*, That these proceedings be spread upon the records of the Association and a copy thereof sent to

the family of the deceased, and also that copies be supplied the daily press of Denver, the American Forestry Association, Washington, D. C., and the International Society of Arboriculture, Chicago.

(Signed) W. G. M. STONE,  
*Vice-President.*

JABEZ NORMAN,  
*Secretary.*

A. L. FELLOWS,  
HENRY MICHELSEN,  
HELEN L. GRENFELL,  
C. E. WANTLAND,  
PLATT ROGERS,  
*Executive Committee.*

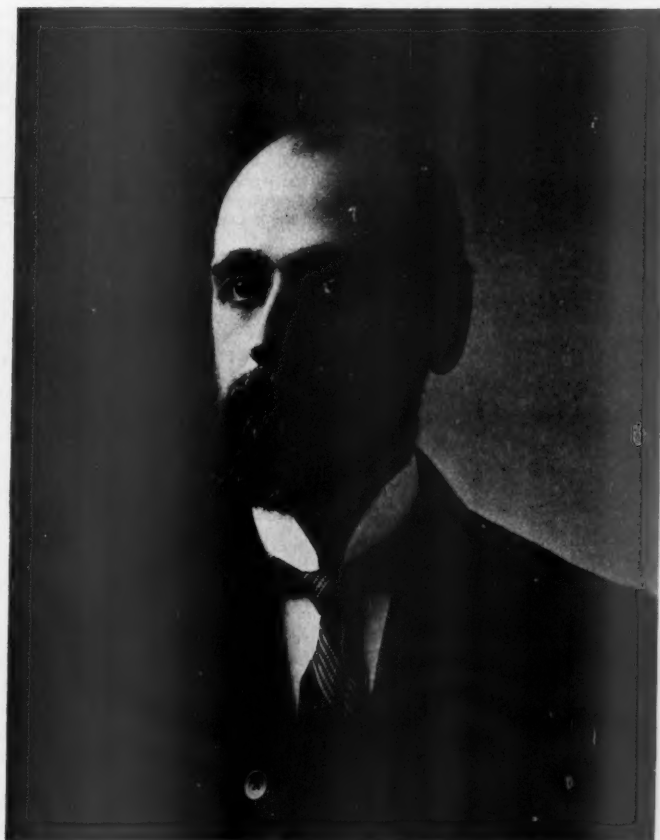
**Pollution of Irrigation Canals.** A new phase of injurious pollution which has developed in connection with some of the irrigating canals near Greeley, Weld county, Colorado, and which threatens to become somewhat serious unless soon controlled, has been forced upon the attention of the hydrographers of the United States Geological Survey.

In the Greeley district there are several large beet-sugar factories which discharge the refuse of thousands of tons of beets daily into the streams and ditches of the neighborhood. This refuse, in the form of a light gray pasty substance, renders the water entirely unfit for household and farm uses, and covers the land flooded by it with a malodorous deposit. It is likely that the matter will soon be made the subject of investigation in the hope of disposing of this refuse in a manner equally satisfactory to the manufacturer of the beet sugar and to the farmer.

It may prove to be a fact that the waste material from the beets can be utilized as a fertilizer and so become a valuable asset to the factories and a benefit instead of a nuisance to the farmers.

The Greeley irrigation district, founded largely through the influence of Horace Greeley, is one of the first irrigation enterprises developed by our people in the West. The district has been very successful, and is now a large and growing community.





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## FREDERICK HAYNES NEWELL,

CHIEF ENGINEER UNITED STATES RECLAMATION SERVICE.

**F**REDERICK HAYNES NEWELL, Chief Engineer of the Government Reclamation Service, was born at Bradford, Penna., March 5, 1862. His education was received first at Needham, Mass., and later at the Massachusetts Institute of Technology, from which he graduated as a mining engineer and geologist in 1885.

Next he engaged in mining in Colorado; later was an assistant in the Ohio Geological Survey, and also did miscellaneous engineering work in Pennsylvania and Virginia, finally joining the staff of the U. S. Geological Survey, where in 1888 he became Chief Hydrographer. In addition to his work at the Geological Survey, he was secretary of the National Geographic Society, 1892-'93 and 1897-'99. He was also secretary of the American Forestry Association from 1895 until March, 1903, a position in which he rendered valuable service in advancing the cause of forest protection.

Mr. Newell began his work under Major John Wesley Powell, the pioneer of the national irrigation movement, and he has been actively identified with it for fifteen years. During this time he has made a most exhaustive study of the water resources, not only of the arid region, but of the entire country, and is to-day the recognized authority on questions relating to water supply. To the investigations made under his direction much of the advance in irrigation in the United States is due.

It is a matter for congratulation that in the carrying out of the provisions of the National Irrigation Act of June, 1902, the actual supervision of the building of the great irrigation works falls into the hands of such a capable engineer. Mr. Newell has an intimate knowledge of the arid regions of the United States, and through years of study and investigation he is better prepared than any man in the country to locate and direct the building of great storage reservoirs. Mr. Newell has considered the problem not only from an engineering standpoint, but has also made a deep study of its economic and sociologic features. In addition to his great skill as an engineer, Mr. Newell possesses a keen insight into business matters, and the people are assured a careful and wise administration of the reclamation work.

Mr. Newell has rendered valuable service through his writings on irrigation subjects. His annual reports on the hydrographic work of the Geological Survey have been of great value. More directly connected with irrigation has been the series of Water Supply and Irrigation Papers, prepared under his direction. These touch the question of irrigation and water supply from every side, the results of experiments by the most capable engineers of the Geological Survey. His most recent publication, "Irrigation in the United States," is the book of authority on general irrigation matters in this country.

## THE OUTLOOK OF THE TIMBER SUPPLY IN THE UNITED STATES.\*

BY

DR. B. E. FERNOW,

DIRECTOR NEW YORK STATE COLLEGE OF FORESTRY.

### PART II.

IN the first paper we have seen that the United States will have to rely for its timber supply upon its own resources and whatever its neighbor, Canada, can spare.

If, as we shall see further on, it is difficult to estimate our own home resources, it is still more difficult, with so vast and largely unsettled a country as Canada. Yet a mere knowledge of physical geography and of the relation of plant production to climate suffices to discredit the extravagant claims sometimes made regarding the natural timber supplies of that country.

The statistician of the Department of Agriculture, at Ottawa, making a report on the "Forest Wealth of Canada," in 1895, sums up the conclusions based on a more or less exhaustive inquiry as follows:

1. The first quality pine has nearly disappeared.
2. Of second quality pine there is a considerable supply.
3. Of other timber woods there is a large supply.

4. We are within measurable distance of the time when, with the exception of spruce, as to wood, and British Columbia, as to provinces, Canada shall cease to be a wood-exporting country.

As the statistician had, before the inquiry, held rather different views regarding the situation, it is not likely that these deductions are radical.

As to the spruce supply, it may be stated that an immense area to the northward and westward, as far as Alaska, contains this class of timber, but, as is to be expected from soil and climate, it occurs mostly in scattered open groves of inferior development, and, while most important for home consumption, unfit for export and use in the arts, being in that respect largely on a par with our own Alaskan possessions.

In fact, in the eastern provinces the true timber-producing area is bounded toward the north by the Height of Land. Beyond this natural limit there are only along water-courses and in limited areas stands which are capable of furnishing lumber trees; the rest is possibly pulp-

\* Reprinted through the courtesy of the *Forestry Quarterly*.

wood, which, as the drainage is northward, away from market, will for a long time remain unavailable.

Canada, with a scanty population, less than six million at present, a country whose climate and soil are largely fit only for timber growing, the round 300 million acres of actual or potential timber land in the eastern provinces could be made to supply a considerable amount for export beyond home consumption. But the same inattention to caring systematically for the reproduction and protection of the timber crop which is characteristic with us prevails in Canada for the present.

Moreover, Canada can at any time close the door to further exports. Indeed, there is now a movement in that direction. It has been ordered that all logs cut on Crown lands shall be sawed within the Dominion, and a strong effort will presently be made to stop the export of pulp logs from the Dominion. At present this is mainly intended to prevent the raw materials from being exported, instead of the manufactured product; but if at any time the reduction of supplies makes it desirable, such restrictions can easily be further extended. We must, therefore, rely mainly on our own stores, and on our own efforts at home to secure the supplies for the future.

We shall now have to find some answer to the other set of questions, which concern themselves with the chances for the supply of these demands from home sources.

First, as to the amount of virgin timber still untouched and ready for use, we have really no knowledge, and only conjectures are possible. Yet a not quite unreasonable guess as to the probabilities is possible, if we have some knowledge of the forest area in different sections of the country, and the usual average stand per acre, and gather other indications leading to a probability calculation.

The writer a few years ago ventured such a calculation, having canvassed the situation from many points of view, and came to a statement of 2,300 billion feet, B. M., still available, of which 1,400 billion was supposed to be coniferous material. Although the census com-

piler is at great pains to show some of the details of this calculation wrong and below the truth, he comes finally to the conclusion that the reported total amount of timber held by lumbermen, namely, 215,550 million feet, is "probably somewhat more than one-tenth the amount now standing in the country," practically the writer's figure or less; and adding up the statements made regarding the standing timber of coniferous material, only 1,100 billion feet are found by the census compiler, as the following tabulation of his statements shows:

Species.	Billion feet, B. M.	
	Standing.	Owned by lumbermen.
Southern Pine.....	300	46.5
White Pine.....	50	16.4
Hemlock.....	100	6.8
Spruce (eastern).....	50	8.6
Cypress.....	65	6.6
Red Fir.....	300	23.8
Western Pine.....	125	24.6
Redwood.....	75	14.3
Sugar Pine.....	25	3.9
Hardwoods (one-half oak).....	?	30.0

The difference of the two estimates would appear to lie mainly in the distribution of these supplies, the writer accrediting the Eastern States with less, the Pacific coast with a larger supply.

The distribution of supplies is of considerable importance commercially, for it influences the location of manufacture and the cost of transportation to market. With the decrease of supplies in one region, a shifting of centers of production takes place in another region.

The census brings an interesting map showing the present distribution of the lumber industry. The most intense concentration of this manufacture is found in the northern section of Michigan, Wisconsin, and Minnesota; in the middle west of New York and Pennsylvania; in Maine and New Hampshire, and on the Pacific coast in Washington, and on a small territory in Oregon along the Columbia River, while the centers

of intensive production in the Southern States are more widely scattered with reference to shipping ports along the coast and Mississippi River.

There are also tabulations showing by geographical subdivisions the relative positions of the different territories as contributors to the timber product and the changes that have taken place in this relative position, as far as the defective census figures indicate. At least the general tendency of this change in the four principal sections may be seen in this tabulation of the percentage of total lumber production contributed by them:

Years.	Northeastern States.	Lake States.	Southern States.	Pacific States.
1850...	54.5	6.4	13.8	3.9
1860...	36.2	13.6	16.5	6.2
1870...	36.8	24.4	9.4	3.6
1880...	24.8	33.4	11.9	3.5
1890...	18.4	36.3	15.9	7.3
1900...	16.0	27.4	25.2	9.6

As supplies gave out, the Northeastern States reduced their cut; as railroad development increased, the Lake States increased their cut until, in 1890, the highest mark was reached and the decline began; the Southern States then increased their cut in proportion. These changes in location are interesting and significant, but for our purpose of forecasting the future, we are concerned only with the supplies as a whole.

Since, owing to change in the standard of the commercial log, owing to closer utilization and to more careful exploitation and manufacture, supplies usually hold out longer than anticipated, it will be perfectly safe to accept the writer's higher estimate, and yet find the situation unsatisfactory. For even if we double this estimate, it is apparent that with a cut of forty billion feet, increasing at the rate of at least 5 per cent per annum, we do not have 30 years' supply of old stock in sight, a serious enough situation to make desirable a more serious, statesmanlike, and businesslike consideration of the forestry problem than it has received hitherto.

We admit that both the census compiler and the writer are mainly guessing at the amount of standing timber, but there are enough data at the basis of these guesses to render them worthy of consideration.

The census brings the information that the stumpage on the lumberman's holdings averages 6,700 feet, B. M., per acre, or in the Eastern States an average of somewhat less than 5,000 feet, and somewhat less than 25,000 feet in the Pacific States. The compiler comments correctly that "the average stand of timber per acre, being that of selected tracts owned by lumbermen is, of course, higher than the average of the country or state."

For the purpose of a possibility—not any more probability—calculation we may assume that the entire forest area of the United States at one time, say only fifty years ago, contained this average stand. With such extravagant assumptions we may be justified in assuming the area involved as 500 million acres, the potential timber area determined by the writer, rather than the 700 million acres claimed by the U. S. Chief Geographer, in which all waste land is included, we would then find a total original stand of 3,350 billion feet. Assuming again that the consumption of 40 billion at present has grown to that amount by only a 3 per cent rate (instead of the more likely 5 per cent) from the original figure, then we would have had a total aggregate cut during the 50 years of round 1,115 billion feet, and if the increasing rate of consumption continued, the balance would be used up in less than 35 years.

The 250 million acres of farms cut out from the forest, mostly wastefully logged and largely burned in log-rolling bees, may be assumed to have furnished the requirements of the preceding period.

These probability calculations merely show that our guesses at the amount of standing timber are not entirely unreasonable, and they certainly lend color to the assertion that unless very radical changes in use and exploitation take place, our virgin supplies will certainly be used up within less than a genera-

tion. But, to be sure, according to the Chief Geographer, "timber growth in the United States is certainly renewing itself much faster than it is being consumed."

The certainty in this respect it would be even more difficult to establish than regarding the standing timber, but a probability calculation is here also possible by borrowing some figures from the experience of a country where timber production is a well-established business and accurate statistics are available.

In German state forest administrations, comprising some 10 million acres under good management, the production of timberwood (over 3 inch) has constantly increased in response to this management, until now it may be stated in the large average, with a rotation of about 100 years, as 43 cubic feet per acre per year, of which 50 per cent, or round 22 cubic feet, are saw-log and bolt size material. These figures must be reduced by 15 to 25 per cent if private and corporation forests are also brought into consideration.

Hence, if we were to assume that in the unmanaged wild woods of the United States a production of 40 cubic feet of useful wood and 15 cubic feet fit to supply saw material takes place, we would indeed be beyond reasonable expectation, especially since fire ravages thousands of acres annually, and the young growth at least is destroyed on them.

Again ruling out the waste and brush lands, which either by nature or by ill-treatment have become incapable of producing any valuable timber growth, the area on which such growth might take place may be set down as not to exceed 500 million acres. With such assumption the new growth would represent 7.5 billion cubic feet of log material—about our present annual consumption.

Any one who is at all familiar with the condition of the timbered forest areas of the United States will readily agree that not one-half the assumed production takes place over this vast area. In the untouched woods the natural decay offsets the accretion, while on the culled area, both in the old and young growth, the larger portion of the after-growth is of weed trees—not valuable timber.

Another way of approximating the possibilities—not probabilities—is to assume the reported stumpage on the lumberman's holdings, namely, round 5,000 feet, B. M., per acre in the eastern United States, as representing the average capacity over the whole forest area. Nature has taken hundreds of years to produce this; but, assuming the same stand left to nature could be secured in 100 years, then the average accretion per acre and year would be 50 feet, B. M. This would not suffice to supply as much as three-quarters of our present annual requirements of lumberwood. And how far are our premises below the probabilities?

Not that under good forestry practice even a better average could not be obtained, for the 50 feet, B. M., represent about 10 cubic feet, forest-grown material, while the German practice produces at least over 16 feet of saw material per acre per annum. In exceptional cases on selected small areas as much as 90 cubic feet of saw material has been attained.

But we have so far no forestry practice, no silviculture, no systematic reproduction. Not even protection of nature's crop against the annually recurring fires exists. And these fires, while they may not destroy or even seriously damage the old crop, as in many cases and conditions they do not, they kill with absolute certainty all the young crop, and there is so far but little hope that they will soon be stopped. What incentive can there be for private interest in spending money or foregoing immediate revenue for a crop which is so readily lost?

We may as well wake up to the realization that our efforts to secure a more rational treatment of our forest resources and apply forestry in their management are not too early, but rather too late; that they are by no means sufficient; that serious trouble and inconvenience are in store for us in the not too distant future; that the blind indifference and the dallying or amateurish playing with the problem by legislatures and officials is fatal.

We can, then, summarize the situation, which justifies the urgent need of



the foresters' art in the United States, from the point of view of supplies, as follows:

(1) The consumption of forest supplies, larger than in any other country in the world, promises not only to increase with the natural increase of the population, but in excess of this increase *per capita*, similar to that of other civilized, industrial nations, annually at a rate of not less than 3 to 5 per cent.

(2) The most sanguine estimate of timber standing predicates an exhaustion of supplies in less than 30 years if this rate of consumption continues, and of the most important coniferous supplies in a very much shorter time.

(3) The conditions for continued imports from our neighbor, Canada, prac-

tically the only country having accessible supplies such as we need, are not reassuring and may not be expected to lengthen natural supplies appreciably.

(4) The reproduction of new supplies on the existing forest area could under proper management be made to supply the legitimate requirements for a long time; but fires destroy the young growth over large areas, and where production is allowed to develop, in the mixed forest at least, owing to the culling processes which remove the valuable kinds and leave the weed trees, these latter reproduce in preference.

(5) The attempts at systematic silviculture—that is, the growing of new crops—are so far infinitesimal, compared with the needs.

## THE AMERICAN INDIAN AND IRRIGATION.

WORK BEGUN BY BUREAU OF INDIAN AFFAIRS  
TWENTY YEARS AGO HAVING GOOD EFFECT  
IN ADVANCING CIVILIZATION OF THE INDIAN.

ILLUSTRATIONS FROM PHOTOGRAPHS BY GEORGE BUTLER AND WALTER B. HILL, OF THE  
BUREAU OF INDIAN AFFAIRS.

**T**HERE are many who have a vague conception of the Indians and know there are such within the confines of our country; but few have concrete knowledge of them, either tribally or individually, and still fewer know, or can realize, the labor and effort that has been and is being expanded to advance to a better life and make worthy citizens of these wards of the government.

When the Indian, turned from his old-time occupations of the hunt, intertribal wars, and the like, was forced to protect himself from the invasion of the foreigners, many of whom were not of the better and more considerate element, the government found it incumbent to overcome, collect, and hold on reservations set aside for the purpose the different Indian tribes; thus advancing as humanely as possible the progress of civilization, while minimizing wars between invader and invaded that were as replete with horrors as the

mind of savage and Christian could make them.

Having curtailed their liberty, restricted their territory of occupation, which was often distant from their old haunts, and imposed a new mode of life, the self-created guardian found it incumbent to issue rations, clothing, and other supplies to mitigate physical suffering threatening the Indians in their new environment. Thus, of necessity, was inaugurated this factor in the intricate Indian policy, that has done more than all else to retard and suppress the development and advancement of these peoples.

While there seemed no alternative course, it would appear that the issuance of rations and annuities was contemplated to continue only so long as the urgency of the case demanded. It was to be discontinued just so soon as the Indian became adapted to the new order of things and could, with governmental aid at first, become self-support-

ing, independent, and equal to the demands of the new life.

It must be remembered that the numerous tribes of Indians, scattered from the Atlantic seaboard westward to the Pacific Ocean and from Mexico to the Canadian line, speak different languages, hold and are governed by religious, civic, political, and social laws and customs that differ as widely as do their languages, excepting possibly the law of hospitality. Thus it will be understood how a comparison of the tribes, one with another, would be about as

reservations within the arid and semi-arid region of the country where most of them are.

Irrigation is no new matter with those Indians in the southwest where crops were raised by irrigation long before the advent of the Spaniard. The relics of reservoirs and canals, large and small, built and used by the people of the cliffs, the pueblos, and plains houses, are still largely in evidence as to one source of their subsistence. Some of these old works are still in successful use, and others of more recent construction by



AN APACHE DWELLING OF A TYPE NOW FAST DISAPPEARING, FORT APACHE RESERVATION, ARIZONA. THESE INDIANS ARE BEING BENEFITED BY GOVERNMENT IRRIGATION.

futile as an effort to measure with the same yard stick an African, a Chiuaman, and an Eskimo. And also it can be seen how impossible it would be to devise a policy that would be applicable to all.

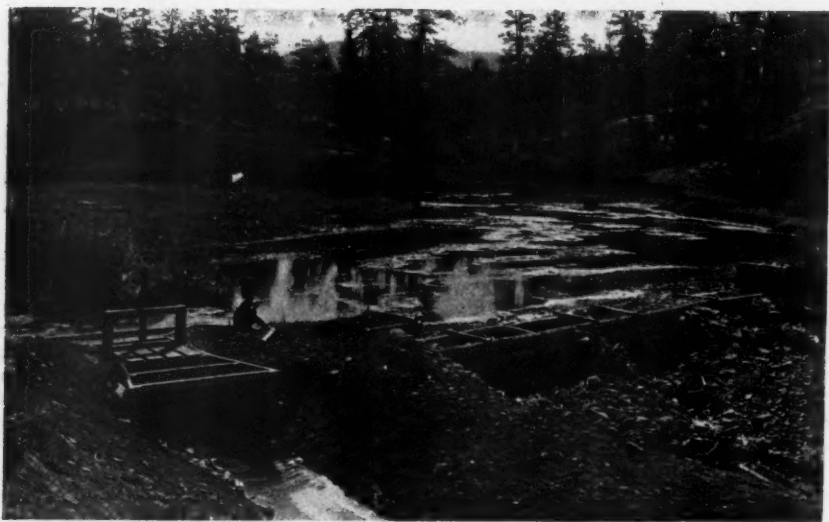
There has long been evidenced a desire to induce the Indians to give up the old nomadic camp-life of forest and plain and turn to agricultural pursuits that would entail permanent dwellings and tend to self-support. Therefore irrigation has been considered as a means of affording farms for those Indians on

the Indians of the past and present generations are also large factors in the life of these people. It was but a matter of course, then, that the government should as long ago as the sixties, if not before, consider a policy already formulated and in force.

Just so soon as the conditions were favorable and the demand for farms or small cultivable areas has been made by the Indian with apparent good faith, the government has endeavored to extend aid in the building of the necessary ditches. Sometimes no pecuniary as-



IRRIGATION FOR THE NAVAJOS, WHEATFIELDS CREEK DITCH, ARIZONA. THIS CANAL WAS BUILT BY INDIANS.



HEADWORKS OF WHEATFIELDS CREEK DITCH, BUILT BY NAVAJOS UNDER GOVERNMENT SUPERVISION.

sistance could be given, and in many cases the Indians took matters in their own hands, building ditches to the best of their ability; some proving successes, others failures.

It was as difficult in the early days as now to secure money appropriations for an unknown project. This, in conjunction with the few and modest demands made for irrigation systems on Indian reservations at that time, may account for the slow though steady growth of a policy that has been proven wise without having to its discredit any big or costly experimental blunders.

During later years the further encroachment of the whites, the increasing aridity, the gradual doing away with the baneful ration system, the commendable allotting of lands in severalty, the progress and advancement of the Indian through natural and educational channels, and his awakening to a fuller realization of the new conditions, coupled with a natural desire for existence and welfare, are all tending to increase his demands for arable lands, for homes, for a chance to become self-supporting and independent. Urgent pleas are coming now from all the reservations within the arid region, and they call for irrigation works of greater magnitude than were formerly thought of. To carry them out will necessitate expenditures in excess of amounts that have heretofore been appropriated, since the limitations and restrictions are such that the Indians cannot undertake the work unaided. To make a success of it a plan of procedure will have to be elaborated from the methods of the past.

In the old days, when the need for an irrigation ditch was apparent and its utility reasonably assured, usually the government agent urged the Indians to construct it, detailing to their assistance any of his available employes, and aiding them in whatsoever manner he could. Sometimes an increased ration or an extra article of issue was the incentive to labor; in some cases a small daily wage was paid, while in the non-ration tribes an issue of food was nearly always responded to.

Sometimes a little money could be had to pay for the running of a level line by

some local surveyor, if such could be found in the region. Often the grade or fall of the ditch was determined by a carpenters' level and a long, straight-edged plank, by a wooden triangle and a plumb bob, or by digging or plowing a small furrow for a short distance and running water into the little channel.

While most of these early ditches were crude makeshifts, resembling the little *acequias* of the Mexicans, they have served their purpose and done good work.

In later years both individual and communal farming among the Indians have greatly increased, and the demands for more and larger arable tracts has necessitated the undertaking of larger, better, and more permanent irrigation works. When a meritorious case is presented a local engineer is sometimes secured to make an examination and report on the scheme. If it is found feasible, he may be continued on the work to direct it to completion, or one of the superintendents of irrigation, in the employ of the Bureau of Indian Affairs of the Department of the Interior for such work, may be assigned to it.

While the object is to give the Indian productive farming land, it has been the custom, with very few exceptions, to employ him in every way possible on the work. The idea is to give him manual training, to teach him to build and care for a ditch, to create a market for his labor, and make him work for a daily wage, even though he be paid to work for his own advantage. Under such a system it has been possible to do most of the work with Indian labor, and only such material as the reservation could not furnish has been bought, and such skilled labor as the Indian could not do has been hired. As a rule the Indian has proved an apt and willing pupil, doing as good and as much work as white employes in like occupations, and is reliable and trustworthy.

In some instances money has been secured for the construction of these irrigation systems by small annual appropriations for the past few years, or by special appropriation to some particular scheme, or by tribal sanction for the application of their own funds.



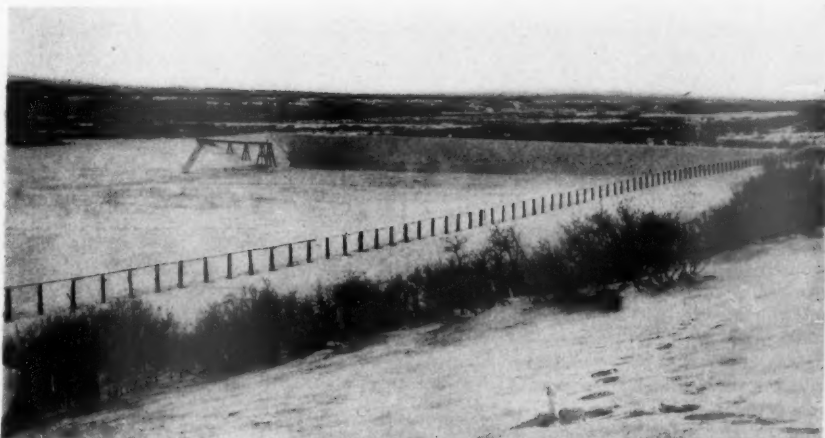
CROW INDIANS AT WORK WITH SCRAPER TEAMS, BIGHORN CANAL, MONTANA.



Photo by D. S. Cole, Hot Springs, S. D.

HEADGATE AND PART OF CANAL, BIGHORN RIVER, MONTANA. THIS CANAL ON THE CROW RESERVATION IS THE LARGEST AND MOST IMPORTANT OF THE INDIAN IRRIGATION WORKS NOW UNDER WAY.





A SNOW PICTURE OF RESERVOIR NO. 2, FORT LEWIS INDIAN SCHOOL, COLORADO; BUILT BY INDIAN LABOR, UNDER DIRECTION OF WHITE MEN.



IRRIGATED FIELD UNDER INDIAN DITCH, SHOSHONE RESERVATION, DUCK VALLEY, WYOMING; AGENCY AND SCHOOL, BUILDINGS IN THE BACKGROUND.

In this last way was made possible the undertaking on the Crow Reservation in Montana of the largest, best planned and executed irrigation system that we have among our Indians. The last and largest ditch of this system, the Big Horn Canal, is now nearing completion. It has a bottom width of 30 feet at the head, banks to safely carry about 7 feet of water, a length of 35 miles, and is capable of irrigating about 35,000 acres of excellent land.

There are quite a number of smaller ditches built during recent years that are constructed according to modern and approved methods, and which are doing considerable good. Still other and larger systems are now under consideration. That these are and will be profitable to both the Indians and the government is well proven, for it gives the Indians occupation and a source of livelihood during construction that warrants the abolition of the ration system for those engaged. By the time the ditch is completed they have had a training that prepares them for the cultivation of their little farms, and it is reasonable now to expect them to labor for existence.

As to the policy of irrigation being one of the greatest factors for education and civilization of the American Indian there can be no question. The building of irrigation works on a reservation, bringing land otherwise barren and profitless under the most favorable conditions for agriculture, affords an opportunity of inestimable value to the tribe to become independent, an offer they are quick to take advantage of. Government control and direction of the works cannot, however, be withdrawn for years, or until such time as the Indian is advanced sufficiently to intelligently coöperate for the best development of communal works, to place reliable and capable members of his own tribe in charge of the canals, and to subserve personal interest to the good of the whole.

Indian irrigation is therefore a problem that is yearly growing to larger proportions, demanding more money, more work, and greater care in the inception, construction, and subsequent control of the different projects; and only by its aid, in conjunction with the allotment of lands, can we hope for our red brother's evolution to worthy citizenship.

## CRATER LAKE NATIONAL PARK.

A DESCRIPTION OF THE REGION AND OF THE SHEET  
OF WATER WHICH FORMS ITS CHIEF ATTRACTION.

BY

J. MAYNE BALTIMORE.

THE Crater Lake area, the subject of this article, records in titanic strokes the graphic story of the rise and fall of a wonderful volcano, leaving behind it one of the natural wonders of the world.

The actual history of Crater Lake as known to man dates back only a comparatively few years. Twenty years ago the general public was unaware of its existence and the first official recognition came in 1885, when it was proposed as the center of a national

park; no law was passed, though President Cleveland set aside by proclamation ten townships in the region, which were later included in the Cascade Range Forest Reserve. From that time interest languished except for sporadic outbursts of enthusiasm at the accounts of some hardy explorer, until the Mazamas, the well-known mountaineering club of Portland, Oregon, took an interest in the lake, and in the summer of 1896 held their annual meeting on its rim, and named the



EAST PALISADE OF ROUND TOP, CRATER LAKE. THIS GIVES AN EXCELLENT IDEA OF THE PRECIPITOUS SHORES.



WIZARD ISLAND, LOOKING FROM THE ROUGH LAVA FIELD OF ITS WESTERN SLOPE TOWARD THE CINDER CONE.

mountain which once rose on the site of the lake after their organization. In many ways the mountain, no longer in existence as such, is worthy of greater consideration than the lake itself, and Mount Mazama, whose name appears in no atlas, has been provocative of widespread scientific interest and discussion.

Crater Lake has long been an object of interest to the Mazamas, who in 1896 explored the whole area now included in the Park, an area remarkable for a score of wonders even without the lake which gives the name and crowning feature. Union Peak and Mount Thielsen, culminating volcanic points of the Cascade Range, are remarkable themselves; there are wonderful canyons through beds of brilliantly colored lavas, creeks and cascades of great beauty, vast timber belts, and plateaus and valleys containing grassy meadows of a greenness almost unimaginable. In the midst of these wonders, like a jewel of great price, is set the sapphire clearness of the lake, a gem in its perfection.

Yet it must not be supposed that the lake is small. It is apt to appear so from the bigness of its surroundings, but in reality it has a surface of more than 20 square miles, being roughly circular; its widest diameter is  $6\frac{1}{4}$  miles and the narrowest about  $4\frac{1}{4}$ . This shows it to be larger than any of the Saranac Lakes, in the Adirondacks, or Lake Drummond of the Dismal Swamp, in Virginia. Its wonderful characteristics are its precipitous sides, rising in sheer cliffs in most places from 1,200 to 2,000 feet from the surface of the water, though at some points the slopes are less abrupt. Yet at no point will a stone started at the top of the rim be apt to stop before it plunges into the water below, carrying with it a miniature landslide from the talus slopes. Near the west shore of Wizard Island a volcanic cone rises 845 feet above the surface of the water and contains a well-defined crater 250 feet in diameter and 80 feet deep.

The walls of the lake are as precipitous below the water line as above, and descend to a depth of at least 2,000 feet,

proving it the deepest fresh water on the Western Hemisphere. Where all the water comes from is a mystery. The precipitation and the streams from melting snow which empty into it from the very limited drainage area cannot account for so much water, and the temperature records seem to prove that there is no subterranean inflow. There is a fluctuation of about four feet between the recorded high and low water marks of the lake, the rising of the water being in some measure affected by the banks of snow which drift over the precipitous rim in the winter. Most of the lowering of the water level can be accounted for by evaporation, but a certain amount must escape by percolation, though it must be at some distance and through tortuous channels, as there is no water in the immediate vicinity which issues from the ground with greater force than that of an ordinary spring. A direct outlet would jet forth with considerable violence from the great pressure. The animal life of the lake is represented by minute crustaceans, the most numerous of which is *Daphnia pulex pulicaria*. There are a few trout artificially introduced from Klamath Lake.

Mere words of description are, however, cold and inadequate. The lake has a beauty and grandeur all its own, inspiring an enchanting spell of wonder, which to be realized can only come from a visit to its borders and long looks over its clear blue waters. The shores are most brilliantly colored lavas, slags, and tuffs, their many hues glorified and magnified in long kaleidoscopic reflections on the rippling surface of the lake.

But marvelous as the lake itself is, there is another and perhaps greater feeling of wonder when the imagination contemplates the changes which must have taken place in the past to produce the spectacle of the present. Mount Mazama, although existing only as a name today, was at one period a peak which outrivalled any others of the Cascade range. Its history is not a matter of conjecture, but one which has been read with painstaking care by government scientists from the unmistakable geologic evidences everywhere present. From a short distance away the mountain



A BIRDS'-EYE VIEW OF CRATER LAKE, FROM A RELIEF MAP.



MOUNT MAZAMA RESTORED. FROM A DRAWING OF IT AS IT MIGHT APPEAR.



which holds the lake appears to be a comparatively level table-land, containing irregular heights rising from the serrated peaks of the crest of the Cascade Mountains. Its outer slopes, with well-marked lava-flows and glaciated canyons, conforms in general appearance to that of Mount Shasta, across the border in California, with the exception that Shasta rises through even slopes from a comparatively low base, while Mazama rises among mountains approximating a height of 8,000 feet. At this height the diameter of Shasta and Mazama are about the same, and it is fair to suppose that above this point the latter peak rose at least as high and probably higher than California's grandest mountain. On a conservative estimate no less than 17 cubic miles of material above the present rim of the lake remains to be accounted for. Two theories have been advanced; one, that the mountain, at some mighty convulsion, literally blew its head off, leaving the hole which the water now fills. This theory is apparently borne out by the wide area over which pumice and ashes have been thrown, certainly from this now extinct volcano, and at the time of a great eruption. The second theory, and, on the whole, the more tenable one, is that the depression was produced by a subsidence of the top of the mountain. The principal argument against the first theory is that the sides of the lake are not torn to fragments as they certainly would have been had such an explosion taken place, and there are generally not sufficient evidences in the surrounding country that such a monstrous cataclysm could have taken place. The theory that the top of the mountain collapsed is borne out by the fact that some of the lava flows of the rim are bent backward into the depression and are so broken off that it seems probable that the sinking took place while they were yet in a molten state. Subsequent activity built up the volcanic cone of Wizard Island in the great caldera which was left. A contractile cooling

can not account for the loss of so great a mass of matter, nor has there been found any vent below the level of the bottom of the lake, where there has been an escape of volcanic material which would compensate for the mass of the top of the mountain. But the fact that the mountain once existed is sufficiently established by the configuration of the slopes, although the material which once rose majestically in the air to a height of more than 14,000 feet has not been altogether accounted for.

Such, in brief, are the principal facts connected with Crater Lake and its origin. Although difficult of access at present, the shortest route calling for some 80 miles of hard staging after leaving the railroad at Ashland, Oregon, the region is destined some day to become a well-known and often-visited "public park or pleasure ground for the people of the United States," according to the words of the act of May 22, 1902, establishing it. The area embraced within the park limits amounts to 249 square miles. Even without the lake it would present a wonderful field, not only for the tourist, pleasure-seeker, or sight-seer, but for the scientist, whether interested in the flora and fauna of the region or the geological or mineralogical aspects. No embargo will be placed on such visitors, and everything will be done for their convenience and comfort. But the Secretary of the Interior, in connection with the Secretary of War, will prevent all wanton depredation, and game and fish will be rigidly preserved. Special care will be taken to prevent forest fires, and this should render the region immune from what has lately proved to be the most destructive scourge of the forests of the Northwest. This latter precaution against wanton depredation of the forests will help to preserve a wonderful forest of Sugar Pine, in the midst of a belt of timber which is known the world over.



# A MEDICAL AND SURGICAL OUTFIT FOR FORESTERS.

BY

DR. JOHN GIFFORD,

NEW YORK STATE COLLEGE OF FORESTRY.

THE ordinary medical and surgical emergency outfits, as prepared by drug houses for parties living in regions far away from physicians and drug stores, are for several reasons unsatisfactory for the forester. Many of these outfits contain drugs of doubtful medicinal value. Some contain drugs which should never be placed in the hands of others than regular physicians. Others lack the common but efficient household remedies with which men of ordinary intelligence and experience are familiar. Many contain drugs which are never used, and none familiar to the writer seem especially fitted to the needs of men living for several weeks in remote districts.

In cases of illness it is, of course, always proper to call in a physician; but the backwoods doctor is often so far behind the times that one is safer without his services. In cases of light illness a doctor is very often an unnecessary expense.

Whether doctors are available or not, it is nothing short of criminal negligence to send a party into the woods for a considerable stay without an emergency outfit.

A careful, intelligent member of the party should be given sole charge of the emergency kit. He should administer medicines and order more when one or more articles are exhausted. This should be done at once, because the most useful articles are the ones first exhausted. Many expeditions have with good intentions started out with complete emergency outfits, but which, owing to lack of replenishment and care, soon became useless impediments.

It should always be borne in mind that to the sick and wounded *first aid* is the important aid. Serious illness

and even death may be averted by doing the proper thing at the proper time. This aid is often slight and of such a nature that a thoughtful, intelligent person can give it as well as an experienced physician.

I have had charge of an emergency outfit for several years. This has undergone and is still undergoing change. A lot of medicines recommended by doctors whom I have consulted have been discarded and only those are carried which I have found most useful. Other persons might prefer other kinds, for in matters of this nature there is ample room for diversity of opinion. I have been frequently asked for a list of the materials in my chest. I give it below for the benefit of those in need of such an outfit.

I. A pocket Cyclopedia of Medicine and Surgery, by Gould and Pyle.

II.\* Quinine, 2 gr. pills. For malaria, fever, cold, and general tonic. As a general tonic and preventive against malaria, one after each meal.

III. Anti-malaria. Quin. sulph., 1½ gr.; acid arsen., ½ gr.; powd. capsicum, ½ gr. Two every three hours for chronic and acute malaria.

IV. Oil of citronella. Since malarial fevers are transmitted by mosquitoes the damage of infection is much reduced and comfort secured by the free use of this oil on face and hands. The genuine should be used, and not cheap, ineffective substitutes.

V. A. S. and B. pills for chronic constipation. Aloin, ½ gr.; strych. sulph., ⅓ gr.; ext. belladonna, ⅓ gr. Two tablets at night for torpid liver and as a laxative in chronic constipation.

VI. Excellent laxative. Ext. cascara sag., 1 gr.; ext. nux vom., ¼ gr., ext. belladonna, ⅓ gr.; ipecac powd., ¼ gr.; podophyllin, ⅓ gr. One to three at night.

VII. Calomel, ¼ grain. One every two hours until cathartic action is produced, followed by seidlitz powder or epsom salts, for biliousness and torpid liver.

\* These doses are for adults only.

VIII. Seidlitz powder.

IX. Epsom salts.

X. Sun cholera mixture. Tr. opium, 3 min.; tr. rhubarb, 5 min.; tr. capsicum, 5 min.; spt. peppermint, 5 min.; spt. camphor, 5 min. Indicated in diarrhoea attended with profuse watery discharges and prostration. One to two every three or four hours or as needed.

XI. Calomel and capsicum comp. for diarrhoea with cramps. Calomel,  $\frac{1}{8}$  gr.; morph. sulph.,  $\frac{1}{8}$  gr.; powd. capsicum,  $\frac{1}{8}$  gr.; powd. ipecac,  $\frac{1}{8}$  gr.; camphor,  $\frac{1}{8}$  gr. One every hour or two as necessary.

XII. Lime-water tablets. For acidity and nausea. In the mixture known as carron oil (a lotion of linseed oil and lime water), excellent for burns and scalds.

XIII. Phenacetine, 1 gr., five at a dose, repeated as necessary, for neuralgia, rheumatism, and headache. Excellent in headache and neuralgia in combination with caffeine.

XIV. Cold in the head. Camphor,  $\frac{1}{4}$  gr.; quin. sulph.,  $\frac{1}{4}$  gr.; morphine sulph.,  $\frac{1}{32}$  gr.; atropine sulph.,  $\frac{1}{3000}$  gr.; ext. glycyrrhiz,  $\frac{1}{2}$  gr. One to two every half hour or so.

XV. Liniment tablets. Camphor, capsicum, ext. belladonna aa,  $6\frac{1}{2}$  grs. Dissolve one tablet in one oz. alcohol.

XVI. Brown mixture comp. for coughs and colds. Ext. licorice,  $\frac{3}{16}$  gr.; camphor,  $\frac{1}{16}$  gr.; acid benzoic,  $\frac{1}{16}$  gr.; oil anise,  $\frac{1}{16}$  min.; opium powd.,  $\frac{1}{16}$  gr.; tartar emetic,  $\frac{1}{16}$  gr. Dissolve one in the mouth every half hour, stopping as the symptoms lessen and the cough becomes free.

XVII. Olive oil.

XVIII. Camphor.

XIX. Leadwater and laudanum tablets. One tablet to one oz. of water. For sprains, bruises, and poison due to sumac.

XX. Carbolized vaseline. For all kinds of skin abrasions and wounds.

XXI. Sulphur and ichthyol ointment for skin diseases and all parasitic skin affections.

XXII. Blue ointment (poison). For chronic ulceration and animal parasitic affections of the skin. Excellent for the prevention of rust on fire-arms.

XXIII. Zinc ointment. For skin diseases and chronic sores.

XXIV. Potass. permanganate, 2 grs. Antidote to morphia. Useful when locally applied in bites of poisonous snakes and insects.

XXV. Corrosive sublimate. One tablet to one pint of water makes a solution of 1:1000. Valuable germicide. Tablets should be colored green and stamped with the word "poison"

XXVI. Formalin. A 40% aqueous solution of the gas formaldehyde. A powerful disinfectant and deodorant. Weak solutions (0.5%) may be used as gargles and mouth washes and stronger ones (2½%) as lotions for skin diseases. Formaldehyde is manufactured from wood alcohol.

XXVII. Aristol, a valuable antiseptic pow-

der, combination of iodine and the oil of thyme; free from disagreeable odor; excellent dusting powder for ulcers, wounds, and skin diseases; with vaseline as a base, excellent for the poison due to sumac.

XXVIII. Iodoform, an antiseptic powder commonly used on wounds, ulcers, and skin diseases; possesses a disagreeable odor.

XXIX. Iodine, used locally in the form of tincture for sprains, bruises, chronic rheumatism, etc.; used only locally in the form of tincture or ointment; applied as a paint with a camel-hair brush.

XXX. Anaesthetic. Camphor,  $\frac{1}{4}$  gr.; morphine mur.,  $\frac{1}{16}$  gr.; oil cajeput,  $\frac{1}{16}$  min. One every hour for relief of pain and diarrhoea. The oil of cajeput is distilled from the leaves of the fever tree of the East Indies. The scientific name of this tree is *Melaleuca leucadendron*.

XXXI. Trional, 5 grs. to produce sleep.

XXXII. Brandy, difficult to keep in stock.

XXXIII. Alcohol.

XXXIV. Ammonia.

XXXV. Turpentine.

XXXVI. Glycerine.

XXXVII. Linseed oil.

XXXVIII. Ground mustard for plasters.

XXXIX. Ground flaxseed for poultices.

XL. Castor oil.

XLI. Surgical outfit and sundries: Cheese cloth and red flannel for bandages; absorbent cotton; 2 certified fever thermometers; surgeons' soap; scalpels and tweezers; needles and ligatures; metric glass graduates;  $\frac{1}{2}$  doz. pipettes;  $\frac{1}{2}$  doz. assorted camel-hair pencils; adhesive plaster; mustard leaves; bandage scissors; small glass syringes; one hot-water bag; one fountain syringe for enemas; one rubber bandage; one pair thin leather anklets.

It is interesting to note that two of the most important drugs in the above list, quinine and camphor, are tropical forest products.

Instructions in reference to the use of these medicines may be found in Gould's Pocket Medical and Surgical Dictionary.

The cost of the outfit depends, of course, upon the amount needed, which depends in turn upon the size of the party. Of some of the drugs only small quantities are needed. Phenacetine, aristol, and trional are expensive. The other drugs recommended are comparatively cheap. As near as can be easily estimated, \$20 will purchase an outfit sufficient for a party of considerable size for one season.

# GENERAL PRACTICE OF IRRIGATION IN THE UNITED STATES.

APPLICATION OF WATER TO FARM CROPS COMING INTO USE IN ALL PARTS OF THE COUNTRY.

BY

LESLIE HARRISON.

WHILE the idea of irrigation farming is associated in the minds of most persons with the arid and semi-arid regions of the West and Southwest, it must not be supposed that such operations are by any means confined solely to those parts of the United States. It is true that a large portion of the territory of this country lying west of the rooth meridian is within the arid region and agriculture must there be carried on by irrigation; and the great fertility of the soil in connection with the scientific application of water permits an intensive farming whose returns far exceed those of the ordinary "dry farming," where agriculturists have to depend on what has been facetiously termed "the old-fashioned rain method." Yet granting this fact of greater returns, and granting also the fact that the irrigation problems now most urgently before the country relate for the greater part to the reclaiming of arid America, it must still be admitted that there is a large and constantly increasing field for the practice of irrigation in the eastern and what are known as the humid sections of the country.

The last census shows that irrigation is used in practically every state of the Union, from Maine and Florida on the east coast to Washington and southern California on the west. In the East the greatest advantage, except perhaps in the cultivation of a few intensive market crops, lies in the use of irrigation to save crops at critical moments of their growth when a prolonged drouth threatens a complete destruction. Often in such cases comparatively inexpensive works will save a great deal of

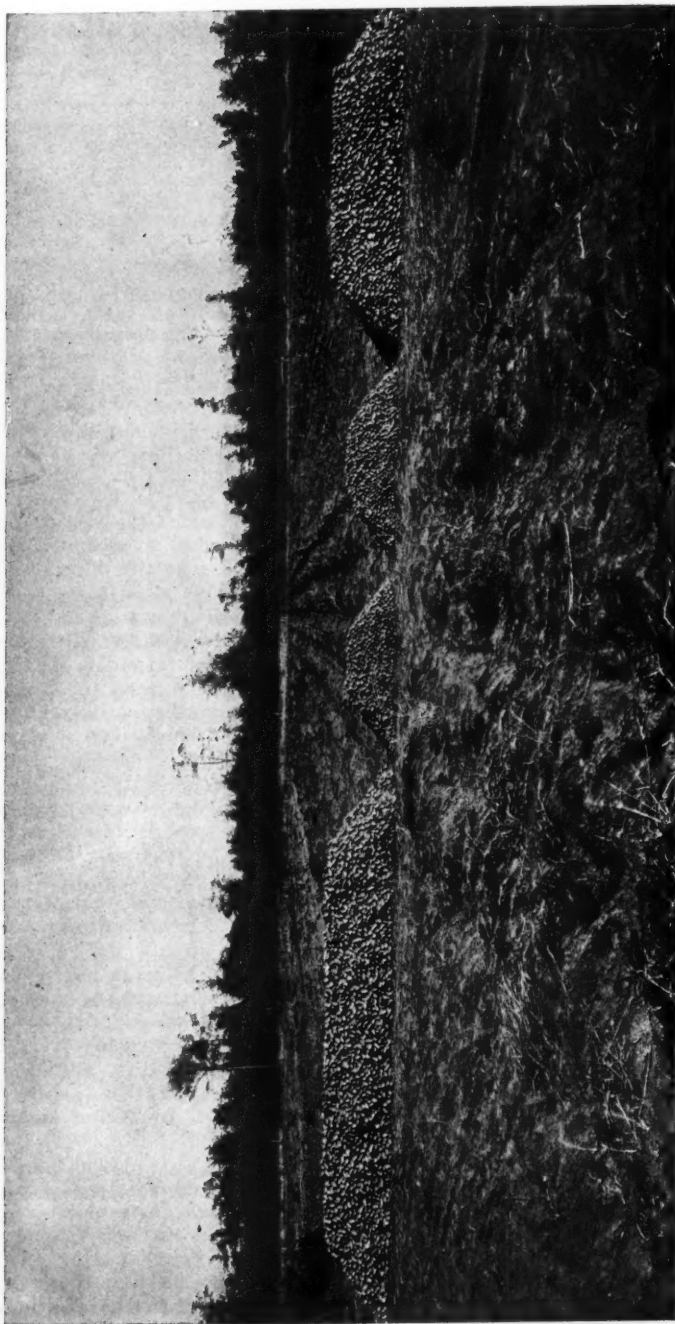
money and prevent crop failures and total losses.

Another reason why the West and the West only is considered the province for irrigation comes from the fact that while many eastern farmers irrigate their land, they do not seem to consider or name it as such, although any artificial application of water comes under this head. It can thus be seen that there would be some difficulty in getting at the details of irrigation in the East, where a farmer who digs a trench for the application of water to a plot of strawberries or celery does not in his own mind formulate the thought that he is doing exactly the same thing which marks as distinctive the agriculture of his brother farmer of the West. He realizes, nevertheless, the great value of such application of water, and the wonder is that with such realization, following an experience with a certain small crop, he does not increase the practice to cover greater areas of land.

In Maine the area under irrigation is small, and the water is for the most part pumped from wells. The cost of the irrigation system in use in 1899 was \$127.65 per acre, and the value of the irrigated crops was \$150.29.

Massachusetts' irrigated truck farms are fairly well known, and it is said that the first irrigation ditch in America constructed by whites was in the neighborhood of Boston. The cost of irrigation was \$109.55 and the value of products was \$241.24 per acre. One farmer reported an income of \$11,000 from four acres, part of it being under glass.

Connecticut has four times as much land under irrigation as all the rest of



Courtesy Department of Agriculture.  
DIFFERENCE IN YIELD OF POTATOES ON IRRIGATED AND UNIRRIGATED LAND, WISCONSIN.



the New England States have, the cost of the plants averaging about \$35 per acre irrigated.

Rhode Island has some irrigation systems, with a cost of about \$75 per acre.

New Jersey shares with Massachusetts in the general reputation of having the most valuable irrigation properties of the states of the Atlantic seaboard. At a cost of \$36 per acre for irrigation, the crops under such cultivation yield \$126 per acre, and land under irrigating is valued at \$155 an acre. New York's average cost per acre for irrigation is \$35.54, and the value of the product is \$95. Some crops on irrigated lands in this state are valued at \$260 an acre. In Pennsylvania, where irrigation in some form has been practiced for at least 100 years, the acreage principally watered lies in the southeastern part of the state, with hay as the principal crop, with a value of 23.64 per acre. It must be admitted that with a system involving any considerable expense, the irrigation of this crop in the east does not give adequate returns, especially as compared to the results obtained in the irrigation of small fruits and garden truck.

The states just south of Mason and Dixon's line have but lately taken up the possibilities of irrigation, and those who have tried report that there has been a great deal of prejudice to overcome among neighbors and others out of sympathy with "new-fangled" ways. Yet in spite of this and other drawbacks there have been encouraging reports of the results of irrigation in Virginia, most of the advantage coming from the ability to save a crop in time of drouth. Irrigation on tidal streams in the Carolinas has been in use for some time. Georgia planters have taken up irrigation under much the same conditions that prevail in Virginia, and considerable success has followed the installation of plants. On 400 acres near Rome, Ga., valuable crops have been saved by timely application of water, and the practical demonstration of the value accruing in such a case will likely be followed by extensive additions to the works now completed. Irrigation does

not occupy a very important place in the agricultural development of Alabama, but the acreage devoted to the growing of early vegetables for northern markets is increasing and the product from such irrigated land is valued at \$121 per acre, with an installation cost of \$60.

When we come to Florida we find irrigation on an extensive scale and playing a relatively important part in the productivity of the land. Indeed, in 1899, Florida ranked first in acreage irrigated, cost of plants, and value of crops raised among all the states of the humid area. The usual cost of irrigating plants for general crops is about \$50 an acre, and although the policy of artificially supplying water dates only from 1888, the results have been so uniformly satisfactory that the number of irrigators has increased steadily year by year. When the "freeze" of 1894-'95 brought failure to many orange growers, and the increasing risk from this source became apparent, many farmers turned their attention to raising early fruits and vegetables for the northern markets, and this gave another impetus to irrigation. The water supply is drawn from a comparatively high artesian water table, which seems to underlie the entire state, and in many cases there is no cost whatever for pumping. The most expensive systems in the state irrigate 250 acres of tobacco at a cost of \$145 per acre, raising a crop worth \$365. Of the Atlantic states Florida is the only one whose irrigated areas are counted in thousands of acres. The average cost for plants is \$101.52 per acre and the value of products \$303.95.

Louisiana, another state in the humid belt, at present rivals Florida through the recent growth of the rice industry, due mainly to irrigation. It is claimed that during the past year more money was spent in this state on irrigating canals and other works than in any other in the country. The acreage in this state and eastern Texas in irrigated rice amounts to nearly 200,000. For a long time "Providence" rice was the only kind grown, "Providence" being another name for rain; but it was not always a profitable crop, and irrigation



Courtesy Department of Agriculture.  
IRRIGATING STRAWBERRIES; PIPE FOR CARRYING WATER SHOWN IN FRONT OF PICTURE.

was adopted to completely insure good returns. With comparatively low costs and easy lifts for the pumps used to raise the water from streams and wells, this region has proved extremely profitable for irrigation, and large amounts of capital have been invested.

Missouri, Michigan, and Wisconsin, all within the humid region, are more and more using irrigation for vegetables and small fruits, and chief among these products are strawberries and potatoes, the yields being enormously increased, both in quality and quantity. In the case of strawberries in Missouri, in an exceptionally bad season, many old plants died without sending out runners, but in all cases it was found that irrigated plants developed strong crowns, thus ensuring crops for the ensuing year. The effect of serious drouth on fruit trees and nursery stock was largely offset by irrigation, and the serious check, from which many trees do not fully recover for several years, was avoided.

The great distance from eastern to western Texas brings us well into the arid region of the country; and, as we have said, the greatest irrigation interests of the country center about the

newer states of this area. For a long time there was some difficulty in overcoming a natural fear on the part of the eastern farmer lest the opening up of these marvelously fertile regions by the application of the needed water should tend to lower the values of his own farm products. But it has been ably pointed out by Secretary Wilson and others, that the greater development of the West means a consequent development of many lines of industry, and an industrial expansion which will create home markets for the goods of the eastern cultivator with demands far in excess of those which he had known before. The eastern manufacturing interests, receiving an impetus from the needs of the growing West, will employ more men to turn out their products, and these men will have to be supplied with foodstuffs, which come from neighboring farms. Also experience has demonstrated that the rancher of California does not and cannot supply the staples furnished by the eastern farmer, but merely supplements them. Through this knowledge the East has come to look upon the arid land reclamation as the best and surest policy of expansion for the country to enter upon.

## CONSERVATIVE LUMBERING IN TENNESSEE.

DESCRIPTION OF THE SUCCESSFUL APPLICATION OF  
PRACTICAL FOREST METHODS ON THE DOMAIN OF  
THE UNIVERSITY OF THE SOUTH, SEWANEE, TENN.

**T**HE result of the first application of practical forest methods in the cutting of timber in Tennessee is contained in Bulletin 39 of the Bureau of Forestry, recently published.

The Bureau of Forestry in 1900 undertook the management of the forest at Sewanee, Tenn., owned by the University of the South. The forest had been misused for many years and was steadily declining in value; but the financial condition of the university prevented any expenditure on its improvement and demanded that it be

made to yield immediate returns. In spite of these disadvantages a plan of management was devised and applied which has been profitable and has left the forest in good condition after lumbering.

The lands of the University of the South, in and around Sewanee, Franklin county, Tenn., comprise about 7,255 acres, 6,655 acres of which are timberlands. About 5,500 acres lie on the top of a spur of the Cumberland plateau, lined by sandstone escarpments of varying height, from the base of which coves

slope into the valleys below. The elevation of the land is from 800 to 1,900 feet above sea-level.

Two types of forest grow at Sewanee, one confined to the plateau, the other to the coves. Although \$3,000 for all of the timber was considered a fair offer by the university in 1899, yet under the plan of management of the Bureau of Forestry the university made in 1900-1901 a net profit out of its cove timber alone of about \$1,500 and the following year of about \$1,200. The forest on the plateau had been burned and grazed so long that its improvement in quality and composition was the urgent problem. A plan of treatment was made whereby the labor expended on the improvement of the plateau forest would be paid by the returns it would yield. Although the work of improvement done on the plateau was required to be self-supporting only, it yielded a net profit of about \$500.

Four more years of lumbering remain to be done, and for three years at least there is an assured annual profit of \$1,500, or half of what the university was formerly willing to accept for all of

the timber. In a word, timber formerly valued at \$3,000 will have been made to yield a profit of about \$7,000.

The high profits were made possible through the careful planning of the lumbering in order to prevent waste and to secure the largest returns from the merchantable trees. In the cutting provision was made that the land should again produce valuable timber.

The working plan for the Sewanee forest does not furnish such specific instructions for the management of timber lands of a similar kind that it can be applied to them without modification and expert assistance. It illustrates, however, what may be done with such timber lands; and especially does it emphasize that lumbering and forestry may be practiced together in the South, as elsewhere, with profit.

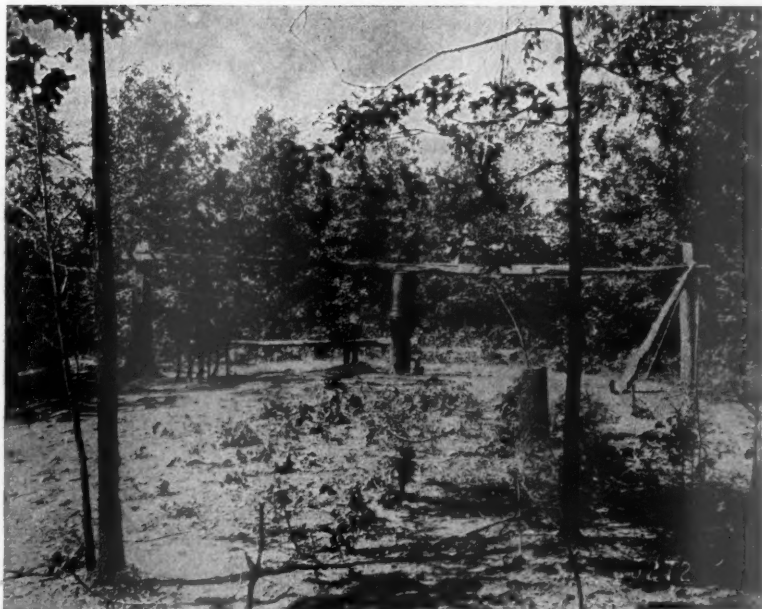
The work of preparing the working plan for the Sewanee forest was carried on under the direction of John Foley, field assistant in the Bureau of Forestry.

A logging contract for the coves was made, which required that the following rules be observed:

1. Only marked trees shall be cut.



VIEW OF A COVE ON DOMAIN OF UNIVERSITY OF THE SOUTH, AT SEWANEE, TENN.



DRUM FOR DRAWING LOGS FROM COVE TO THE PLATEAU, SEWANEE.



CHUTE USED FOR BRINGING LOGS UP TO PLATEAU, SEWANEE.





LOGS FROM SEWANEE FOREST AT THE SAWMILL.

2. All marked trees shall be cut, unless a reason satisfactory to the inspector is given for leaving them.

3. Except in the case of hollow or dote, no stumps higher than one foot above the ground shall be cut.

4. Care shall be taken not to injure young growth while felling, cutting, or hauling the timber.

5. As much as possible of each tree shall be cut into logs two inches longer than the lengths called for by the mill.

6. The logs shall be well butted and hauled to the mill.

7. Every effort shall be made to extinguish any fire which may be seen.

A separate contract was made with the same man for logging the plateau, containing the same rules, with this additional rule, that "such White Oak and Chestnut Oak trees and parts of trees that will not yield sawlogs shall be cut into as many railroad ties as possible."

The University of the South, in lumbering its tract along conservative lines, has set other owners of Tennessee timber lands an excellent example. This, the first example of the application of practical forestry in the handling of Tennessee woodlands, has certainly been successful enough to induce other owners of timber lands to consider the matter. It is notable that since the start of this work plans have been requested from the Bureau of Forestry for the management of several other and larger timber tracts in eastern Tennessee.

There are likely in the United States other tracts of timber owned by the land-grant colleges that could be made to produce increased annual revenues if managed along the lines in force at the University of the South. In this the University of the South has set an example that land-grant educational institutions might consider with profit.

## TONTO RESERVOIR PRACTICALLY ASSURED.

AGREEMENT LIKELY TO BE MADE SOON BETWEEN  
FEDERAL GOVERNMENT AND ASSOCIATION OF PROP-  
ERTY OWNERS OF SALT RIVER VALLEY THAT WILL  
INSURE COMPLETION OF GREAT IRRIGATION PROJECT.

A MEETING held at Phoenix, Arizona, on Saturday, April 19, gives assurance that the early beginning of work on the Tonto Reservoir, near that city, is probable. This is one of the five reclamation projects which recently received the approval of the Secretary of the Interior.

Through Mr. Chas. D. Walcott, Director of the Geological Survey, the Secretary of the Interior announced officially at this meeting the position of the government toward the people of the Salt River Valley.

Mr. Walcott stated that he was officially authorized to inform the citizens of the Salt River Valley:

First. That the Secretary of the Interior has granted authority to the Director of the Geological Survey for the acquisition of the necessary property, rights of way, etc., preliminary to the construction of irrigation works on the Salt River, Arizona, under authority of the reclamation act, approved June 17, 1902. The construction remains subject to the feasibility of obtaining the necessary rights, and the adjustment of private claims in such a manner as to comply with the provisions of the act.

Second. That in response to inquiries from a citizen of the Salt River Valley the Secretary of the Interior has decided:

A. That the Secretary of the Interior can, under the law, deal with an organization in receiving payments from individuals who have contracted for water rights under the terms of the reclamation act.

B. It is not necessary or advisable at the present time to determine upon a general form of organization to be taken as a basis in organizing every reservoir district.

C. The particular form of organization for the Salt River Valley may be modified in the future as necessities may

require, but for the present the form already adopted is considered sufficient.

D. It is probably possible in completing the details of distribution to make arrangements whereby the owners of vested water rights may be benefited. Such details, however, are not essential for present consideration, and may safely be left for initiation by the local organization of water users. Their united opinion upon the matter should have weight in the final determination.

In regard to the case of Salt River Valley, where there are several thousand owners of small tracts who desire to be supplied with water under the terms of the law, and in other similar cases, it is clearly essential, to insure unity of purpose and to secure the best results, that such owners unite in an organization which will act as the agent for the individuals.

It is also essential that such organization as a whole guarantee that the payments be made, and that the strongest possible security be given the government for the faithful performance of contracts which may be made.

Third. That the department has considered the appeal of the minority of the Salt River Valley Water Storage Conference Committee, and decided that any interposition on the part of the department would appear to be unnecessary and tend rather to delay and complicate affairs and would not result to advantage in the execution of the law.

Relating to the plan of organization of the Salt River Valley Water Users' Association, the following are its main provisions:

Each share of stock gives:

1st. Right of its proportion of all water available for distribution by the association.

2d. Right to have that water carried to the land to which the share is appurtenant.

3d. A perpetual right to the use of that water on that land.

4th. All these rights and the share itself are made perpetually appurtenant to the land.

Thus establishing united ownership of land and water.

*Distributing System.*—The distributing system to its outermost lateral must be under the control of one organization of water-users that is responsible to the Secretary of the Interior as long as the government retains any interest in the works constructed by it.

*Assessments.*—Assessments for the ordinary cost of operations, maintenance, and repairs should be equally assessed against all the lands under the distributing system. Any attempt to assess on the basis of proportional benefits would lead to endless confusion, litigation, and dissatisfaction. The land near the head of a canal should pay per acre the same as that at the end of the last lateral.

The safety and well-being of the entire system is of equal interest to all land-owners. Public interest of the community should be maintained as against the selfish claims of the more favorably situated land-owners.

Assessments for local benefits should be assessed against those benefited, but general benefits should be assessed against all lands alike. An attempt to make "equitable" assessments for general purposes would lead to confusion, litigation, and dissatisfaction.

*Security for Repayment to Government.*—The government retains title to all public lands under any irrigation system built by it until all payments are made, *i. e.*, has the title to the land. The same security should be maintained on all private lands until the last payment is made for cost of construction, operation, and maintenance.

As the government cannot well take a lien on the land, it must deal with some organization that has such a lien and control the action of that organization by the government control of the water supply going to it.

This can only be accomplished by the organization of the water users under the system into an association through which they can act as a unit in dealing

with the government. The government will deal with the individual in issuing to each person a water right and patent to his land, if not before obtained, but each individual will agree with the government that the association will act as his agent in the payment to the government of the moneys due from him, and that a delivery of his share of the reservoir water to the association shall be deemed a delivery of it to him.

It is felt that the articles of association of the Salt River Water Users' Association will carry the above plan into effect in a manner satisfactory to the Department of the Interior.

The modifications proposed by the minority would, if adopted, weaken the security of the government through the association, and would make the administration of the distributing system complex and impracticable. They would also seriously limit the power of the government to enforce its rules and regulations through the association.

It is provided in the articles of incorporation that they are subject to the rules and regulations of the government concerning the storage, diversion, delivery, application, or use of any water stored, developed, or delivered to the association.

This assures the water user that he will receive his due share of the water, no matter whether near the headgates or at the end of the outermost branch of the distributing system.

He is protected by the right of appeal to the government if its rules and regulations are not carried out by the association. Under the present system a water user might subscribe for a reservoir right, but if he was located under one of the several independent canals, he could not be assured of its delivery.

The Tonto Dam project for storing water to be used in the Salt River valley appears to be entirely practicable. The work of construction will be begun as soon as the water users of the valley organize in such form as to give the necessary assurance to the Department that the cost of the Tonto dam and necessary improvements will be returned to the government as provided for in the Irrigation Act, approved June 17, 1902.

## IRRIGATION OF LIMA BEANS.

CHIEF CROP OF VENTURA COUNTY, CALIFORNIA.  
SUGAR BEET CULTURE HAS BEEN INTRODUCED—  
WATER IS PLENTIFUL AND CAN BE EASILY APPLIED.

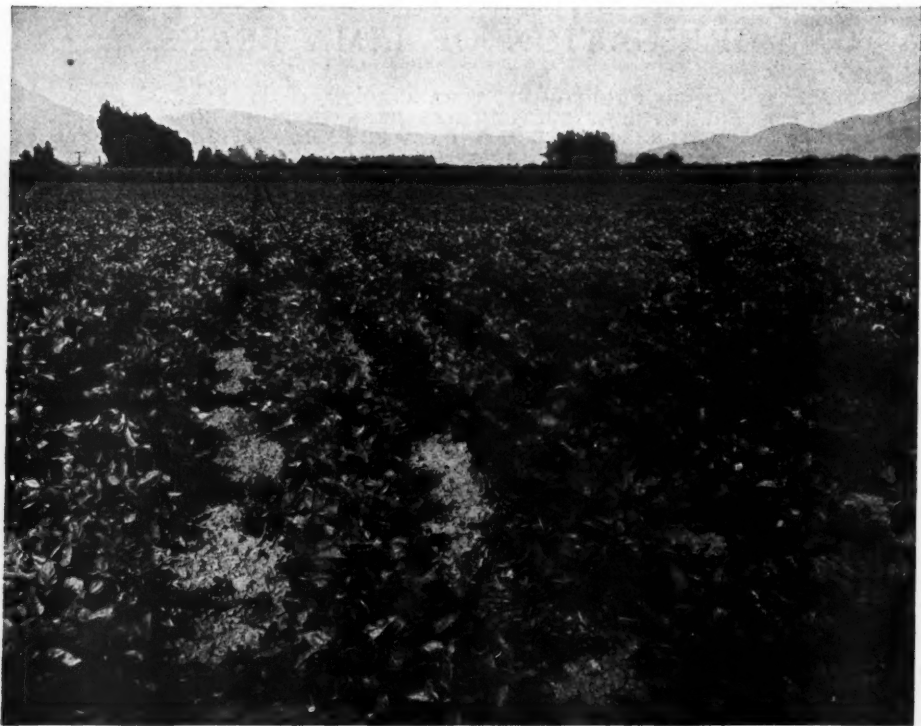
THE valley of the Santa Clara River, with the city of Ventura at its Pacific Ocean outlet, extends to the northeast through an opening in the Santa Paula Mountains to the Mojave desert. This gives rise to peculiar conditions. As might be expected, with a desert at one end and a seashore at the other, the soil is generally sandy, and with the silts carried by the river, its fertility is assured. The valley has peculiar climatic conditions. In the summer months when a California sun beats down upon the desert, raising the temperature there to extreme heights, and when this heated air rises according to inviolable physical laws, the Santa Clara Valley acts as the draft door of a furnace, allowing the cool, moisture-laden winds of the ocean to sweep in, bearing fogs during the summer and rain clouds in winter. The precipitation amounts to an average of 16 inches a year, and the valley is exceptionally well supplied with streams, which are either torrents or dry arroyos, according to the season. The wind at the delta end of the valley, with its drifting sands, would do much damage were it not for wind-breaks of eucalyptus trees.

Under these peculiar conditions it was only natural that a crop to fit them should be evolved, and the bean represents the survival of the fittest. Agriculture was first begun, with the exception of the little tilling of native Americans, in 1782 with the establishment of the mission San Buena Ventura. The cultivated lands were for a long time in the immediate vicinity of the mission buildings, and later the wider areas of the valley, now fertile fields, were cattle ranges, most of the land being under Mexican grants. About the centennial year the lands were subdivided for cultivation and the usual differences of opinion between cattlemen and farmers arose, with bitter encounters in and out

of court, until the increasing value of the lands for agricultural purposes drove the *vaguero* out, just as he had gradually been ousted during the homestead development of the West. The Mexican grants were for the most part confirmed, the status of ownership settled, and titles cleared. From that time the development of the valley has been consistent, if not rapid.

To tell a Ventura County man that he "doesn't know beans" might be almost an insult, and would certainly display an ignorance of the crop that has made Ventura famous. A comparatively small area in beans in its southwestern part gives California an enviable place among the states which produce this article of diet. With an annual yield of about 30,000,000 pounds in this area, California ranks third, yielding to New York and Michigan.

Wheat, barley, and corn were the first crops tried, but the general foggy weather, causing rust, settled the fate of the first of these three. Other localities could do as well or better with corn and barley, and, since specialization seems the keynote of California agriculture, the ranchers of Ventura county cast about for some other crop suitable to their fields, and decided on the lima bean. For a long time they were hampered by poor shipping facilities. Finally wharves were built, and the coming of the railroad gave direct communication with the eastern markets. From 1886 the cultivation of the bean supplanted all other agriculture in the valley, and there was considerable alarm on the score of overproduction; but beans would keep indefinitely, and there was no disastrous effect, except one year when more than 50,000,000 pounds were produced when marketing facilities were very poor. This was a number of years ago, and there has been no return of the condition.



Courtesy Bureau of Soils, U. S. Dept. of Agriculture.

A FIELD OF LIMA BEANS THE PRINCIPAL CROP OF THE VALLEY.

The cultivation of the lima bean is very simple. In the first place, there is little attention paid to rotation of crops, as beans, like all legumes, seem not only to take but little from the soil, but to actually enrich it; and there are some fields near Ventura on which beans have been planted for more than twenty consecutive years without any appreciable deterioration of the soil, and in some cases an improvement is averred by the owner.

The crop is removed from the fields in the fall and cultivation begins at once. The earth is worked to a depth of 10 or 12 inches and the clods pulverized with disc harrows and rollers, and with a special harrow which "chisels" the soil. In some cases the land is not plowed at all from year to year, but is kept cultivated, and "chiseled" before

planting. The beans are put in the ground in May with a special machine, which plants four rows at a time. This comparatively late planting is done in order to get the seed into the ground after the last rain of the wet season, for two reasons: in the first place, it is easier to work the ground to prevent the escape of moisture before the crop is planted; and, secondly, if the rain has packed the surface of the soil after the bean has been planted, when the root sprout pushes the bean through the surface to start the plant above ground, it is unable to penetrate the crust formed, the planting has been of little value, and in most cases has to be done over again.

After the plant is above ground it is cultivated two or three times to prevent the growth of weeds, and for this an



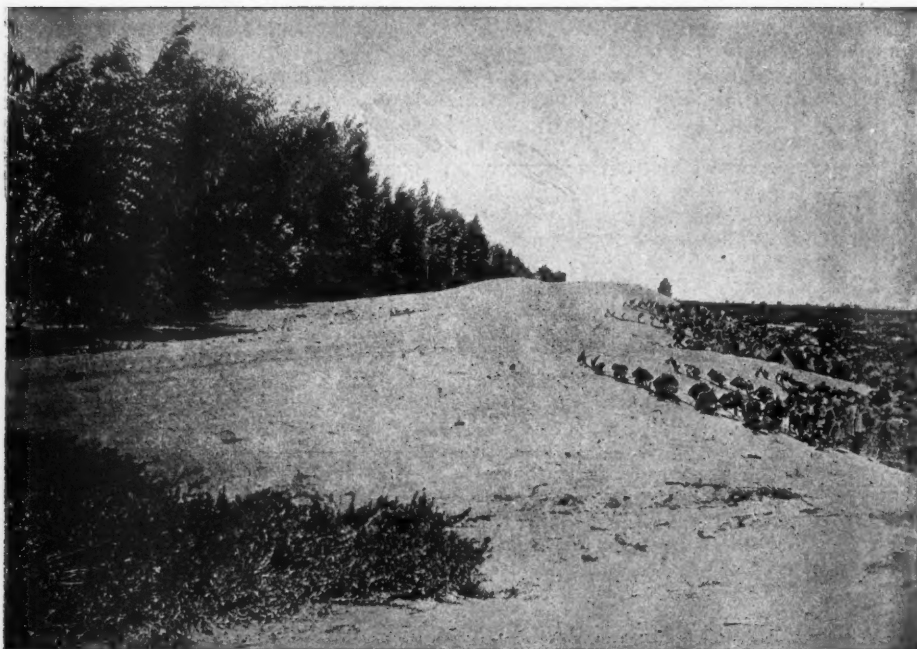
ordinary two-horse riding cultivator is used. The shovels are so made that they pass only slightly beneath the surface, cutting off the weeds, but not exposing the moist earth to the sun. No poles are used and the plants spread out to form a compact mat on the ground, where they produce blooms and pods until the September harvest time, when they are cut off just below the ground, two rows at a time, by a one-horse power machine, which works as rapidly as the horse can walk. Men follow with forks, pile the beans in small cocks, and leave them to dry about three weeks before threshing. The thresher is the same which is used for grain, with a few slight modifications to avoid the crushing of the beans. Some planters still use the more primitive methods of trampling with horses, or horses hitched to harrows or to wagons. After the threshing the beans are hauled to the nearest warehouse to await shipment.

The irrigation of this crop more than doubles the yield, or increases it from about 1,500 pounds of dried beans to the acre to 3,000 pounds. It will be noted that in the foregoing description of methods of cultivation no mention was made of the application of water, and this points to the notable thing in bean irrigation. It is, generally speaking, a misstatement to say that the beans are irrigated, for the truth of the matter is that they are not touched by water from the time of their planting until they are harvested. The irrigation is applied before the crop is planted, and as the soils of the region are exceedingly retentive of moisture, this application lasts the deep-rooted bean throughout its period of growth. A crop planted without this preliminary irrigation of the ground is only half of what it might be, unless the last rain is exceedingly heavy and finds the ground well prepared for its reception. The planters who do not



Courtesy Bureau of Soils, U. S. Dept. of Agriculture.

WINDBREAKS OF EUCALYPTUS TREES ACROSS THE DELTA PORTION OF THE VALLEY.



Courtesy Bureau of Soils, U. S. Dept. of Agriculture.

DRIFTED SAND ALONG A WINDBREAK SHOWING WASTE OF GROUND.

practice this winter irrigation before the crop is put into the ground use furrow irrigation about the first of July, when the bushes are of a fair size; but this method is expensive on account of the extra labor in furrowing and cultivation, though it is of great value in the areas of light, loose soil, which could not hold the winter application for a great length of time.

The presence of moisture in the soil is a prime factor in the marketing of the beans, as it is the practice of the buyers to send their agents through the fields to bid on the crop, the bid being determined almost entirely on the question as to whether there is enough moisture present in the soil to properly mature the crop. Part of the valley is given up to the ordinary white navy bean and the black-eyed bean, both of which mature earlier and are better able to withstand drouth.

The other principal crops of the val-

ley are the sugar beet, deciduous fruits, English walnuts, and barley. The beet is the most important next to the bean, but its introduction came within the past five years and followed the establishment of the Oxnard sugar factory, at Oxnard. The beet is irrigated in practically the same manner as the bean and produces a good crop, but has the disadvantage of impoverishing the soil when rotation is not practiced.

It must be admitted, however, that irrigation in this valley is not what it should be when the natural advantages are considered. No other county in the southern semi-arid portion of California is so well supplied with water as Ventura. The Ventura and Santa Clara Rivers, with their tributaries, drain a great area of mountainous country, and in the winter are torrents, carrying off the major part of the rainfall immediately, since the mountains are water-washed and gullied and for the most

part treeless. Enough water is retained in the mountains to furnish only a small summer supply for irrigation, and this is drawn upon only when the rainfall has been deficient, or less than 15 inches.

There is an artesian belt which supplies some water. The winter supply, however, is unlimited. Even in the years of lightest rainfall these rivers are roaring, and every little canyon, dry and parched in summer, runs bank-full after a rain. It is the general opinion of those who have farmed the lands that large crops are always possible with 15 inches of winter rain, and the annual run-off is sufficient to supply every foot of ground in the county with more than 15 inches; so all that would be necessary to produce maximum crops each year would be canals to divert the flood-water upon the valley lands. This would mean a great advancement for the ranchers of Ventura county, and would place their valley in the forefront of California's agricultural districts, with an absolute surety of salable crops at large profits in ever-ready markets. On the most conservative estimate the actual profit from each acre of land should be almost \$60 annually, and this would warrant the expenditure of even more money than is necessary for the development of an extensive system of winter irrigation. Moreover, this system could be developed here without the slightest fear from alkali, and even in those seacoast areas which contain alkali in such quantities as to be now unavailable for cultivation the drainage problem is so simple that their reclamation would be a paying enterprise.

With irrigation, too, other beneficial results would surely follow. The first of these would come from the fertility-laden flood-waters, always carrying in suspension a great amount of sediment, largely organic matter rich in plant food. Experiments show that this sediment not only supplies sufficient soil elements to offset those taken off by the plants, but that its plant food may be actually in excess of that carried off, so that the lands are made richer each year. Attention has already been called to the wind-breaks necessary to prevent the drifting of sand in the delta portion of the valley. The second great advantage of more extensive irrigation would be in connection with these. The addition of the finer silt particles would serve to bind the sands, make them more retentive of moisture, and the area of cultivated land would be so increased that the wind-breaks, with their wasted areas of 50 or 60 feet on each side, could be removed. Coupled with this, it might be feasible to clothe the sides of the mountain with trees, and thus help to prevent the rapid run-off of the winter rains; also with the introduction of the sugar beet, which takes a great deal from the soil, the use of the flood-waters, serving to offset this entirely or in a large measure, will make more remote the day when artificial fertilizers may have to be resorted to; and with flood-waters, rather than artesian, applied where the alkali problem exists, there would be an easier solution of that problem, as the flood-waters are not impregnated with harmful salts by leaching through the soil.



## "ANOTHER NATIONAL BLUNDER."

**N**OTE.—It is not often that we are able to give our readers something on forestry along humorous lines. Therefore we take unusual pleasure in reprinting the following communication which recently appeared in *The Rocky Mountain News*, of Denver. We reproduce it as a sample of one kind of opposition to the federal government's forest reserve policy, and as a further argument in favor of establishing more reserves.

There are many pretenders, but here we have the real champion of personal liberty. He shakes George III until one hears the ancient bones rattle. Science, scientists, and the federal government are taken by their several necks and tossed into space. The President is advised, an ex-President goaded, and the "eastern dude" is broiled and served with *sauce piquante* by this defender of the people's rights.

The "defy" is made, and it is indeed an inspiring sight, with Mattes well to the front and center, in the full glare of a self-directed lime-light, waving on high the Magna Charta, and with the spirit of '76 burning hot within his veins—that famous old brand unadulterated, and in this case reinforced by the buzz-saw. Now will the federal government tremble, and purchase peace by permitting the wild-cat sawmill free access to the remaining timber on the public domain. The way has been pointed. Here is the rally cry for freedom—and free timber.—EDITOR.

*To the Editor of The Rocky Mountain News :*

The timber question is as old as English history, and it is a continual struggle of human nature against the tyrannies, castes, and fads that civilization is so prone to breed. The blundering tyrannies of the English kings became so unendurable that a special amendment of the Magna Charta abolished their forest reserves and forbade their re-creation. The timber question also figured in the revolution; the lumbermen were forbidden to ship their products from one colony to another and the pine tree was the first emblem of American liberty—the Pine Tree flag. That was a very serious national blunder for Great Britain. The forest is still the home of freedom and its fruits are the perpetual nourishment of the people's rights.

We are well acquainted—eastern people are—with a class of beings, the offspring of suddenly acquired wealth, having little ability and less love for work, but a great tendency to ape aristocracy. Idle from their youth, in order to kill time they took to travel, and, unlike the tramp who wanders over his own country, they wandered abroad. The great works of civilization had little of interest for them, and their apish instincts led them to the woods. Here they found their heart's delight—great tracts of timber owned by royalty and nobility, abounding in game, and the vulgar, common people entirely excluded.

Upon their return a great cry was

raised, lamenting the gradual disappearance of our forests and game. It had little effect, for the Anglo-Saxon had come here, not to protect the wilderness against civilization, but to transform it into a garden. The common people very naturally refused to listen to their best to vacate the country and abandon their high vocation.

They wandered forth again and fell in with the Khedive in his Egyptian deserts, who, unable to distinguish between cause and effect, was planting trees to make rain. They hurried home and, enlisting science on their side, raised another wail for the preservation of the forests, and Congress heeded them to the extent of allowing them a fourth of the public domain to cultivate rain on the Great American Desert. The timber-culture act was a very harmless blunder, as harmless as it was fruitless, and when the rainmaker and the newspaper sharps showed Congress the absurdity of the law it was very sensibly repealed.

Then a new pretext was devised. Congress was induced to protect the natural forests that remained in order to preserve our rivers; the forest reserve was invented. Invented? No! The ancient English forest laws were merely transplanted to free American soil; and what a history they are making for themselves, and what trouble they stir up.

Can you stop the sun in his course?  
Can you turn back the star of empire?

Can you unmake man, whose first command was to subdue the earth? Neither can you head off the western pioneer, the great American home builder, the nation builder, that exceeds any product of history. And what are you after? You want to run the common people out of the woods in order that the wild game may furnish sport for your wealthy eastern dudes—your "American aristocracy." Pretexes without number have been invented, but not one scientific fact has been demonstrated that favors the forest-reserve idea.

The first reserve was established, and what happened? Fire followed fire. Our frontiersmen said to themselves: "Dead timber makes better cabins than green, and better firewood, too." So they immediately set fire to the timber and laid up stores enough for a lifetime; for your unlettered backwoodsman reasons in this manner: "Dead timber don't make rain, nor does it make rivers or shelter game; consequently I will be allowed to take all I want of it." He reasons that way, and whenever he is shut out of the timber fires follow. The more reserves we have, the more fires. Out of seventeen big timber fires in Colorado last summer the state official who fought them says twelve were in forest reserves and on the prohibited state lands. The more strictly the laws are enforced the bigger the fires. You cannot govern western pioneers by British forest laws. They have the old spirit of '76 yet, and the dumping of the cargo of tea into Boston harbor is repeated in the Rocky Mountains a dozen times a summer.

A case happened last summer that would never be published but for the writer. A poor mountaineer, not even owning his team, had two tons of hay to feed his horses in the grassless forest of a reserve while he got out dead poles for neighboring ranchmen's fences. He never imagined the reserve laws so strict as to forbid such a harmless trespass; but he was arrested, and, as he had nothing else in the world, his little haystack was confiscated. What happened? A fire that killed thousands of acres of our best timber, and still other fires that cost the government thou-

sands of dollars to extinguish. The government officials laid the blame on the sheepmen, as usual.

I prevented a worse fire about the same time. Seven hundred and fifty thousand acres of land were withdrawn from settlement in order to create another reserve. The little sawmills, including my own, were shut down, and the "timber rats"—the individual timber workers, who get out posts, poles, and firewood for themselves and the other settlers—were ordered off the ground. I knew the people, and I knew there would be war. Patrick Henrys sprang up in every direction. I had to do something, but instead of imitating George III, I went to fighting the reserve. One Irishman boldly told a man he mistook for a government official: "I can go up into the timber and burn it all down and you cannot stop me nor prove it on me." It is a notorious fact that the authorities have never convicted a fire-bug. The people will not testify against one another in a common cause. I had to fight to save the timber while the people were slyly trying to induce me to move my mill to other settings, so that they would not injure a friend; but I devoted all my energies to moving the government, and finally appealed directly to the President. Roosevelt learned his strenuousness from our frontiersmen, and he knows their love of liberty. When he heard how the people felt about it, he immediately vetoed the reserve.

And yet these same despised and abused "timber rats" have been preserving our forests for years by extinguishing the fires started by the ignorance of camping tourists and eastern sportsmen, who have no idea of the high combustibility of green pine timber. They make the best of citizens when it comes to popular government, and the Rocky Mountains will furnish all the William Tells the nation will ever need.

But the forest reserves will have to go. The only reason they have not already gone—gone up in smoke—is that the Government is not enforcing the reserve laws. Whenever it does there is war. Nobody respects them.



While the above happenings were going on three railroads and half a dozen big sawmills were cutting 200,000,000 feet of timber in a neighboring reserve without so much as consulting the authorities about it. What government!

The sheepmen are trying a new kind of war that is likely to send the reserves up in legal smoke. They have obtained a decision from a federal judge that the reserves are unconstitutional. They are surely inconsistent with the Magna Charta of Anglo-Saxon liberty.

The reserves are fast changing from a fad to a first-class national humbug. The laws have been amended until they do not even protect the timber. As this statement may appear incredible I will quote from the Secretary of the Interior's last annual report: "While for the open public lands there is no provision of law which enables the department to sell timber, such provision is made for the forest reserves;" and a little further on he says reserve timber "is sold to anybody." The forest reserve circular of March 21, 1898, page 14, says: "In order to meet the necessities of persons, firms, companies, or corporations, whose business requires a large and continuous supply of timber, it is hereby provided that where the annual consumption exceeds 1,000,000 feet of timber, board measure, application for the succeeding year's supply may be made in time to permit the appraisal and sale of the timber desired six months in advance of its actual need." The corporations cannot get timber from the unreserved public lands at any price. Where is the protection?

From fire? No doubt the reserve officials send in good fire reports. They want to hold their positions; but the newspapers give different reports. It has been customary for the people in and near the timber to watch for smoke and extinguish the fires, but if their timber is taken away from them and they are compelled to court the officials in charge before they can get it, the latter will have a lonesome time fighting fire. Two years ago I got all the men needed to fight a big fire. They came with their own provisions and camping outfits, and never asked a cent

for their trouble. Last year a reserve supervisor could not get men to fight his fire, and the state's fire-fighter is now asking for authority to impress men into his service. Popular government is a success in the West. All other kinds are failures. A hundred cavalymen are trying to enforce the laws in the Yellowstone Reserve, but a hundred more are asked for, and all the standing armies of Europe cannot enforce the laws in all the forest reserves. Imperialism is too unpopular.

Why do the common people object to reserves? It is a question between kinds of government—popular government and monarchical government. Under the former the people are supreme; under the latter they have no rights until they are granted them by the supreme ruler. Outside reserves, the common people legally help themselves to the timber; inside, they must first ask permission from some representative of the supreme ruler, the Honorable Secretary of the Interior. Talk about imperialism!

But should the people be allowed so much liberty? It is wise that they should be. Timber is one of the vital necessities of life—for fuel, for buildings. The East has allowed all its coal to come under private ownership, and with a country full of coal they are having a famine. Would it be wise to put all our timber in charge of one man? Even the common law protects the people's right to free timber. In Colorado last year a gardener dug a tree from one man's yard and planted it in another's as a gift. In the absence of any statute, common law was applied, and it was found that there was no theft, no trespass, and not even malicious mischief.

What then becomes of the great cry of "stealing government timber?" In a monarchy it might be stealing—in some very tyrannical monarchy—and has been punished by death, but in America it has always been our right even as we have a right to the land, to the rain that falls, and to the air we breathe. There is an old national statute making it a trespass, but other laws have been passed restoring the right to

the people while keeping it from the corporations.

"How, then, shall we protect our timber?" It does not need protecting. After building up the mightiest nation on earth, one-third of our land still grows timber; and while that may not be enough for the future, we can draw on the governor of Canada, who has discovered the largest forest of the world in his dominions, 4,000 miles long, 700 miles wide, and offers to supply us all we can use for a century if we will merely take off the tariff.

"But the sawmills are slaughtering it." The poor sawmills! They have borne more abuse than the early Christians. They only cut the big, ripe trees. It was the farmers that girdled the trees and made bonfires of them, and then pulled everything up by the roots. It was the farmers that turned the impervious subsoil on top of the spongy mold and caused the freshets and dried up the springs. Yet Cleveland devoted his first term trying to annihilate them. With more than Christian meekness they said nothing and went on sawing wood. The sawmill men appreciate their high vocation. When they stop sawing the nation will stop growing, and civilization will come to a halt and the world start back toward chaos again. They even get blamed for all the bad weather, but if the chief of our Weather Bureau knows anything about climate, timber has no appreciable effect upon it.

"But the sawmills should at least run their business more scientifically." Who is able to teach the sawmill men the science of their business? It was they who perfected the ax, the most perfect tool of man, the toolmaker of the scientists. Gladstone considered it an accomplishment to be able to chop down a tree, and so does Roosevelt. And no tool on earth requires the skill the circular saw does. It is so delicate that it feels the rotation of the earth and runs better east to west than north and south. Can our "forestry scientists" instruct them? They want them to pile and burn the brush, but any farmer knows it had better lie scattered and rot in order to enrich the soil. "But it helps the spread of fire," they

say. Not as much as bonfires; and big brush piles throw sparks farther than scattered brush does.

"But surely the government can educate them." With the editor's permission I will review:

The Woodman's Handbook, Part I. Henry Solon Graves. Bulletin 36, Bureau of Forestry, United States Department of Agriculture.

Gifford Pinchot, forester for the government, recommends it as "thoroughly valuable to the lumberman and the forester alike, a long step toward the better understanding and appreciation of each by the other." The author states that his purpose is "to give a collection of tables and rules of practical use to lumbermen." He tells how over forty different log rules for board feet are in use, "many of them admitted to be accurate and some almost absurd." These rules are "presented without discussion of their respective merits." In fact, he admits that he has "made no sufficiently extensive study to justify a positive statement that any one of the rules is best," and winds up his preface with asking where he can find some more. Then he gives forty-three log scales for board measure alone, and modestly suggests that the ignorant sawmill man experiment upon them all and find out for himself which is the best. This is "valuable" science—about as valuable as anything our forestry scientists have yet produced. If the author should ever go into the grocery business with forty-three different kinds of scales and begin experimenting on his customers he would have to be correct. If he does not really know how to make an accurate log scale I can show him in ten minutes how to do it with a compass, a yard stick, and simple addition, subtraction, multiplication, and division, and he will be able to figure a perfect scale in a few hours without any more "extensive study." The other half of the book is about as valuable, and as the author is director of a forest school, there is little doubt that it will turn out about as many sawmill men as our agricultural colleges do farmers.

Let the sawmills alone. Drop the timber question. Those two great world builders, the settler and the sawmill

man, have marched across the American continent hand in hand and built up the mightiest nation on the earth in one of the greatest wildernesses; and they have much work ahead of them. Let them alone.

What, then, shall we do with the Forestry Bureau? If these "scientists" will not keep out of mischief and let the West alone, abolish it. Look at their ignorant interference. They are telling us that the little sheep pack the ground so that the rain will not sink into our gravelly soil, while the big cows and horses do no harm. They are telling the sawmill men to cut this tree and not cut that one, while we have to make the kind of lumber the settlers need and choose the trees that will make it. We know our business. They are telling us to burn the offal, when a lighted cigar will easily start a fire in our tinder-box forests. And the Interior Department tries to compel the frequenters of the reserves to do these things or go to prison.

"Why, they are burning the brush in all the reserves." They are not. A government official comes to inspect a tie camp. A feast is prepared for him—turkey, oysters, and champagne—and on the day of his arrival my informant is ordered to take some men and pile some brush. After dinner the inspector is shown the men at work, and then he goes back and reports that the law is being complied with. What fools these mortals be!

"But there can be no harm in the Forestry Bureau investigating scientific problems connected with forestry." When they arrive at erroneous conclusions, there is always harm, to say nothing of the money wasted. Have they the ability to conduct original investigations? Here is how they investigated the effect of timber upon the snow: Money was sent to one of our college professors. He got a friend to go up into the mountains and take a half dozen kodak views of the snow, who found where it had drifted under clumps of trees, and the photos were engraved and a bulletin published, in which the professor dogmatically stated that timber is a great preserver of snow. He did not even see the snow, but upon

this report 750,000 acres of land were withdrawn from settlement in order to furnish water for a proposed government reservoir.

But the greatest objection to forest reserves is that they stop development forever. The homestead law does not apply to reserved lands, nor do the other laws enabling the people to acquire ownership of the public land. Excluding Alaska, about 526,000,000 acres are open for settlement. The reserved lands sum up 151,000,000, of which 60,000,000 acres are in forest reserves that can never be settled upon, not even inhabited or even frequented by people who respect law, for the reserve laws are made by government officials without even consulting the people affected by them. They are impossible to keep, and are not fit for savages, and the people have no redress except in defeating a President, and in the territories they have not even that. What government! The worst of tyrants are the petty tyrants, and behold we see the forestry associations assembled in convention at Colorado Springs last October calling for federal troops "to patrol the reserves."

Shall this nation go on growing, or shall we go on making forest reserves and forever stop its growth? Shall the people have their natural rights restored to them and preserved, or shall the government cater to the spirit that depopulated Europe and built up America? Shall our pioneers be our natural heroes, or the forestry faddists and "scientists," the nation's pets? Read "Forest Law," in the Encyclopedia Britannica, and compare those laws with the reserve laws shown in the Land Office circulars, and you will agree with me that forest reserves and human liberty cannot stand upon the same ground. One or the other must go down.

H. J. M. MATTES.

*Fort Collins, Colo.*

All this reminds us of an old Tennessee moonshiner, who, commenting on the activity of the revenue officers, said: "Since these doggone gover'ment fellers begin acomin' round, a man caint earn an honest livin' any more."

## RECENT PUBLICATIONS.

**Transactions of the Royal Scottish Arboricultural Society**, vol. xvii, part I. Printed for the Society at Edinburgh, 1903. Pp. 168 and appendices. Illustrated

"Ye may be aye sticking in a tree; it will be growing when ye're sleeping," is the motto of this society, and the report of its transactions shows that it does not confine its operations by any means to the mere planting of trees. The papers included cover the whole range of forest activities and are of interest and value, particularly those on the Larch disease. Several papers treat of foreign forests, as in Germany and the Pyrenees, and tell of unique conditions. The entire report is of greater general interest than are most such publications.

**Transactions of the English Arboricultural Society**, vol. v, part II. Printed for the Society at Carlisle. Pp. 362. Illustrated. 1902-1903.

The greater part of the record is given up to the excursions of the society at its summer meeting in France. Included in this are several reports on French forest operations and a comparison of English and French methods. These and other papers, like those of the Scottish Society, have a broad general interest, which should appeal as well to the lay reader interested in the general subject of forestry as to the practical forester. In both, the prime factor for consideration is the "estate" in its relations to forestry and lumbering, which marks a contrast to the "woodlot" areas of the United States, on the one hand, and the vast regions being worked by lumber companies, on the other. There are some analogous conditions in this country, of course; yet, even leaving them out of consideration, there are still many points in the forest policy in England and Scotland which can be made a basis for profitable comparisons.

**Utah Farmers' Institutes**, Annual No. 6, for the year ending June 30, 1902. Published by the Agricultural College of Utah, Logan, Utah. Pp. 160. Illustrated.

Papers read at the Farmers' Institutes during the year under consideration are incorporated in this volume, as is required by a state law. They deal naturally with agricultural problems which confront the ranchers of the state, and are instructive to any one interested in irrigation and the reclamation of arid lands. A paper on the possibilities of arid farming opens a new field of discussion, and should give an impetus to agriculture in some parts of the state where it will never be possible to employ irrigation. The great depth of Utah soils makes them extremely retentive of moisture, and crops can be grown in some areas now considered arid with no further addition of moisture than that afforded by the annual precipitation. The reclamation of alkali lands being conducted in the region of the Great

Salt Lake is the subject of one paper in which the alkali problem is set forth in plain terms and the need of drainage and drainage laws urged.

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**FOR SALE.**—A country place at Lewisburg, Union county, Penna. Adjoins on south the campus of Bucknell University, a natural grove of 27 acres. Thirteen-room brick house, in good repair; barn for horse and cow; fourteen acres of ground, four in fruit and garden, overlooking the valley of the Susquehanna for 60 miles; seven counties visible from front porch; scenery equal to any on the Hudson; climate that of central Pennsylvania; no malaria; home sheltered from winds; many conveniences; free delivery of mail, mountain water in the house, gas, electricity. Seven churches in town. Educational advantages unsurpassed; Bucknell University (co-educational) has 624 students and is growing rapidly; students can do two years of professional work. Academy and seminary for pupils too young for college. **Price, \$12,000.**

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## WYOMING

**FOR SALE.**—Ranch of 415 acres, situated in the southern part of Carbon county, Wyoming, 10 miles from the great copper mining district of Encampment, Wyo. Located on Beaver Creek, a tributary of the North Platte River. In cattle section; fine open range for cattle and horses. No sheep within thirty miles. Only three miles to timber; one mile from school and church;  $1\frac{1}{4}$  miles to country store and post office; daily mail by stages.

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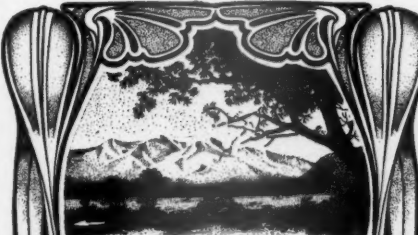
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